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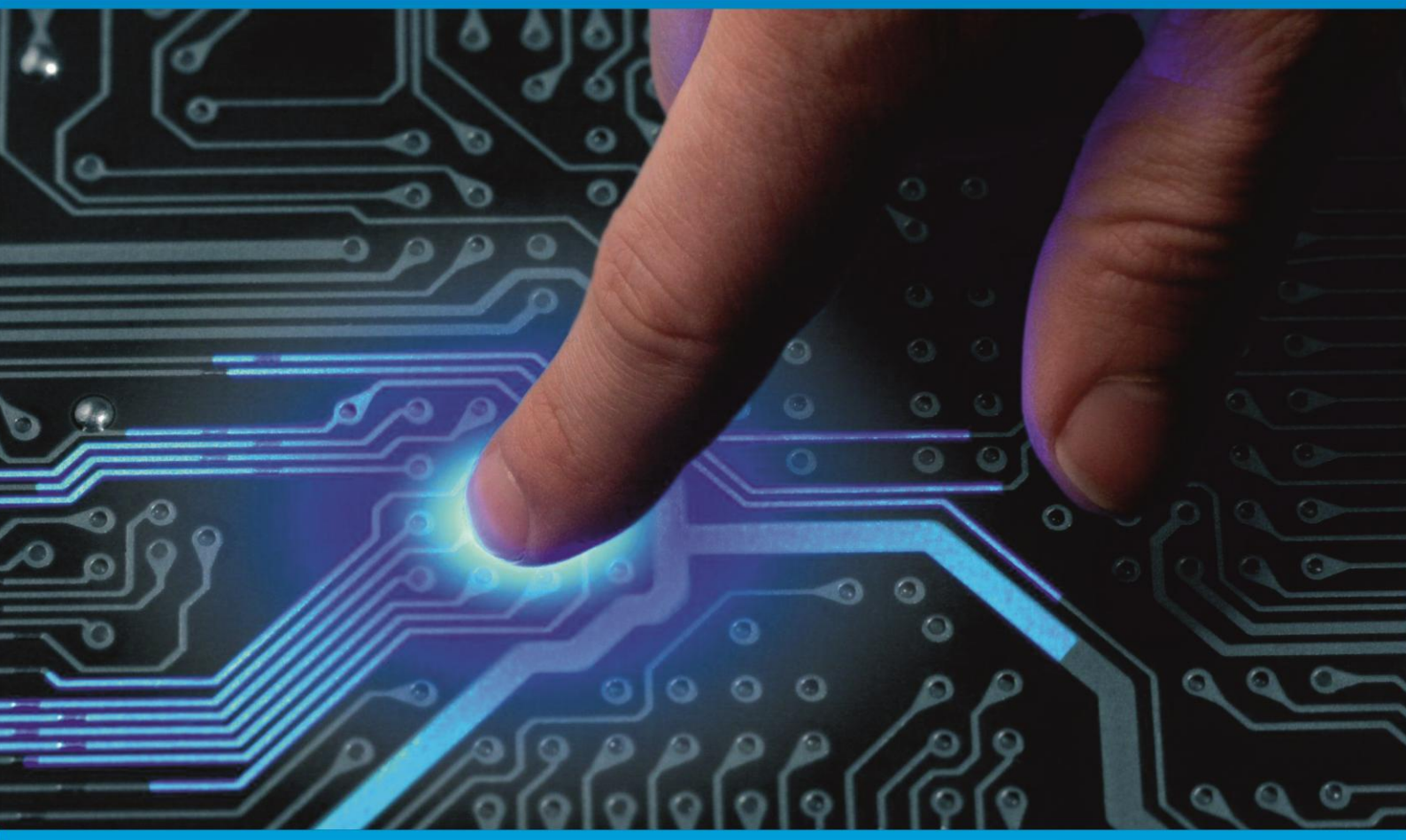

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IOT Based Framework for Student's Interaction

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ABSTRACT: The Internet of Things (IoT) is the connection through the Internet of handling devices within physical objects, allowing them to move and communicate data. These devices may be used in academia to facilitate student-instructor interaction. In this research, I used IoT devices to automate an online examination system. The instructor uploaded the questions online and students provide solutions through IoT devices on University premises. The source code similarity in diverse types of source codes, however, is hard to detect because each programming language has a specific assembly of grammar. To address this issue, a code similarity detection approach was employed to extract the similarity between different source codes. The Latent Semantic Analysis (LSA) technique was used to retrieve semantic similarity by first transforming source codes into tokens to compute and then it finding semantic similarity in a pair of tokens. The dataset contained five different source codes: C, C#, C++, Python and Java. Keywords: Internet of Things, Cloud Computing, Data mining, Similarity, E-assessment

I. INTRODUCTION

The Internet of things (IoT) is the connection of devices, automobiles, and home usage machines that contain microchip technology that permits objects to link, interrelate and interchange data. IoT communicates over Internet with other conventional devices, for example, desktop computers, gadgets, smartphones and tablets. These devices are embedded with expertise which can interconnect and communicate around Internet technology. These devices may be distantly supervised, observed and controlled through the use of use Radio Frequency Identifier (RFID) technology. It can be used in smart health care systems, supply and chain management, hotel management system, industry management and vehicular ahoy network. The IoT network can be used in academia to automate and monitor different activities. The cup carbon simulator is used to supervise and monitor the examination and grading of students by all connected IoT devices. The source plagiarism detection may be used to detect similar programming assignments submitted by the students. It is used to provide a quick assessment of students' programming projects.Plagiarism is a severe threat to academia in that it discourages the learning process in students. Some research suggests that every software contain code similarity in the variety of 10% to 25%. Different source code similarity approaches have been therefore proposed, including code plagiarism identification, bugs solutions and code clone recognition. The plagiarized source code fragments may be innocent or suspicious. The source code examples given by the instructor could be used by students innocently in their assigned programming tasks. The plagiarized source codes chunks are common fragments with different in functionalities and logic. This type is Journal of Theoretical and Applied Information Technology 30th September 2019. Vol.97. No 18 © 2005 – ongoing JATIT & LLS ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195 4724 used as a reliable indication of plagiarism.

The critical task is to detect the instances of plagiarism that can be used for further investigating the source codes. Students can practice this code transformation software for programming assignments to directly translate from one source code type to other different kind. There are several tools developed to detect plagiarism in source codes. The tools JPlag, Sherlock, Marble, Moss, etc. need to link with other information retrieval techniques to detect plagiarism. Every language parser runs the program on its parse tree. The parse tree is also called syntax tree which works on syntax rules of that specific language.

One of the most dynamic and exciting developments in information and communications technology is the advent of the Internet of Things (IoT). Although networking technologies have become increasingly ubiquitous over the past two decades, until recently they have largely been restricted to connecting traditional end-user devices, such as mainframes, desktop and laptop computers, and, more recently, smartphones and tablets.

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Recent years have witnessed the attachment of a much broader range of devices to the network. These have included vehicles, household appliances, medical devices, electric meters and controls, street lights, traffic controls, smart TVs and digital assistants such as Amazon Alexa and Google Home. Industry analysts estimate that there are currently more than eight billion such devices connected to the network and project that this number will expand to more than 25 billion by 2020. The increasing deployment of these devices has enabled new use cases for network technologies. Some experts project that the IoT may generate as much as US$13 trillion in revenue by 2025

II. LITERATURE REVIEW

The Blackbox technique is useful to rank similar statements and functionalities in source code. In the authors used this technique to extract the same code sequence in students' source code tasks. To investigate the similarity, they used the coding style metric of the user that reflects the personality of the programmer. The similarity issue does not arise due to students' inability only, but bad time management is also a big factor. In, the author used the low-level instruction approach to measure the source code similarity instead of tokens based comparison. The Java byte code approach is applied to distinguish the plagiarism attacks in source codes. Many of the students recycled text descriptions methods for similarity identification. But the hybrid method is useful for these both methods. In, the hybrid method is used to excerpt the resemblance descriptions from transitional code creation. Additional, the classification method is programmed to identify the same code segments. In, the authors used LSA to predict similarity in students' codes. This technique is used collectively with Palate to examine similarity among programming languages. More, it is explained how different code portions are important as far as the similarity is concerned. The parse tree can use the parsing of code based on source code from the diverse associate sources. In, the parsing tree kernel technique is used to extract similar text. This procedure does not postulate a better effect due to unbalanced differences in code functionality. Additionally, the algorithm used for learning purposes is projected for enhancing the similarity correctness.

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elementary, classification and generalization. The proposed idea is used on collected data from students' source codes' tasks.
The reprocessing of source code is a rising question in software engineering life cycle. The active characterization of executable code is used to identify the similar text. The similar source code fragments are distinguished in source code by calculating the similarity between functionalities of different statements. Diverse algorithms are designed to extract information for similarity in the code. In, an enhanced Combined Method (CM) algorithm is applied to extract plagiarism among scholars' source codes. Plagiarism detection in codes is a common issue for programming assignments especially in the students' projects related to source code writing. In, the authors described a real-time technique to notice the similarity in students' source codes to progress the learning growth in students. The developed tool is used to catch the plagiarized text in C programming assignments' functionalities. The summary of the text documents can be obtained using the fingerprint process for the text documents. the IoT network is used to automate the e-assessment process in terms of source code similarity.

III. PROPOSED METHODOLOGY: IOT BASED STUDENTS' INSTRUCTOR INTERACTION MODEL WITH SOURCE CODE SIMILARITY AMONG PROGRAMMING LANGUAGES

This University' LMS provides students' instructor communication based on eLearning as follows. The teacher gives programming tasks to students online and in response students submit the solutions. It offers the virtual classrooms ability to students based on interactive lectures. The source code similarity in students' programming assignments between different programming languages is a big challenge. The IoT network may be used to automate the system regarding the type of hardware, time and distance. The sensors are installed in the premises of the university and students use IoT devices to communicate using these sensors. Further, software plagiarism method is proposed to calculate source code similarity between students' programming assignments. To test the proposed approach. I took

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two case studies (stack and binary search) in five unique source codes, i.e. C, C++ C#, Python and Java. Teacher gives programming assignment to students in any of these five languages, and the proposed methodology detects plagiarism in the source code based on semantics. The LSA is used to retrieve similarity between a pair of documents written in different languages. It uses a mathematical algorithm called SVD used to extract text summary or essay grading. First, the source code is preprocessed and change it to the document-term matrix. The preprocessing includes, stemming, root words, minimum and maximum frequencies of each term.and removing noise. Further, the different types of weighting filters are used to categorize tokens according to the similarity contributions. The weighted results rank the terms regarding their participation in similarity.

The range of +1 and -1 is extracted using similarity among the files if I need to calculate the semantic similarity using the cosine similarity measure, which is used by LSA. To range the resultant semantic values in 0 to 2 scale the normalization method is applied. The LSA technique does not affect the syntax and grammatical rules of any programming language because it uses a bag of words model. It takes terms as a bag of words and then extracts the semantic values based on the contribution of the similarity of each term. Every language has a specific structure and grammar rule, but still, LSA detects plagiarism between a pair of two different programming languages. The percentage similarity value is calculated between each pair of varying source code documents. It gives the overall contribution of each normalized token which shows better results to the instructor. The proposed approach works using following Algorithm 1. 1) Decompose the source codes S into a set of tokens set T such that $T \in S$, set k=1 2) Construct a term frequency Matrix M from T 3) Perform Entropy weighting to zoom the importance of each token 4) Perform SVD on matrix M to extract singular value matrix VT= (vi1, vi2, vir) 5) Compute Similarity among Pairs of SVD vectors. 6) Notify Similarity First, we preprocess source code corpus to convert it to tokens without noisy data. Then, term frequencies are computed for each token to show the occurrences of each token. After that, entropy weighting technique is applied to zoom the importance of each token. Then, the SVD technique is applied to reduce the dimensions of source codes data without losing actual information. Finally, LSA algorithm is applied to compute similarity among each pair of tokens. The Internet of Medical Things (IoMT) is an application of the IoT for medical and health related purposes, data collection and analysis for research, and monitoring. The IoMT has been referenced as "Smart Healthcare", as the technology for creating a digitized healthcare system, connecting available medical resources and healthcare services.

IoT devices can be used to enable remote health monitoring and emergency notification systems. These health monitoring devices can range from blood pressure and heart rate monitors to advanced devices capable of monitoring specialized implants, such as pacemakers, Fitbit electronic wristbands, or advanced hearing aids. Some hospitals have begun implementing "smart beds" that can detect when they are occupied and when a patient is attempting to get up. It can also adjust itself to ensure appropriate pressure and support is applied to the patient without the manual interaction of nurses. A 2015 Goldman Sachs report indicated that healthcare IoT devices "can save the United States more than $300 billion in annual healthcare expenditures by increasing revenue and decreasing cost." Moreover, the use of mobile devices to support medical follow-up led to the creation of 'm-health', used analysed health statistics."

Specialized sensors can also be equipped within living spaces to monitor the health and general well-being of senior citizens, while also ensuring that proper treatment is being administered and assisting people regain lost mobility via therapy as well. These sensors create a network of intelligent sensors that are able to collect, process, transfer, and analyse valuable information in different environments, such as connecting in-home monitoring devices to hospital-based systems. Other consumer devices to encourage healthy living, such as connected scales or wearable heart monitors, are also a possibility with the IoT. End-to-end health monitoring IoT platforms are also available for antenatal and chronic patients, helping one manage health vitals and recurring medication requirements.

Advances in plastic and fabric electronics fabrication methods have enabled ultra-low cost, use-and-throw IoMT sensors. These sensors, along with the required RFID electronics, can be fabricated on paper or e-textiles for wireless powered disposable sensing devices. Applications have been established for point-of-care medical diagnostics, where portability and low system-complexity is essential.

As of 2018 IoMT was not only being applied in the clinical laboratory industry, but also in the healthcare and health insurance industries. IoMT in the healthcare industry is now permitting doctors, patients, and others, such as guardians of patients, nurses, families, and similar, to be part of a system, where patient records are saved in a database, allowing doctors and the rest of the medical staff to have access to patient information. Moreover, IoT-based systems are patient-centred, which involves being flexible to the patient's medical conditions. IoMT in the insurance industry provides access to better and new types of dynamic information. This includes sensor-based solutions such as biosensors, wearables, connected health devices, and mobile apps to track customer behaviour. This can lead to more accurate underwriting and new pricing models.

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The application of the IoT in healthcare plays a fundamental role in managing chronic diseases and in disease prevention and control. Remote monitoring is made possible through the connection of powerful wireless solutions. The connectivity enables health practitioners to capture patient's data and applying complex algorithms in health data analysis.

IV. RESULTS AND DISCUSSIONS

Students are not limited to sit in the library or the classroom and to submit any given tasks physically. They may read and update about any activity regarding their studies through their IoT devices. Instructor can give any task to students by uploading online to the system. Then, students can upload the solutions of the tasks from anywhere within the range of these sensors. The Al Balqa Applied University sensors network is being simulated in figure 1 and figure 2. The online examination system has the feature to analyze the similarity between different source codes solved by the students. I used cupcarbon simulator to extract students' and instructor information from IoT devices. Sensors are configured in different regions of Al-Balqa Applied University Jordon using cup carbon simulator.

Different programming languages' code can be used to calculate the plagiarism among them using semantic similarity. In the current study, we have used five programming languages for the experiments. These programming languages are C, C#, C++, Python and Java

Semanticsimilarity between a pair of different source codes in the same case study using the LSA technique. It extracts semantic similarity between tokens and does not use the grammar rule of any specific programming language. There are twenty different semantic similarity tables are extracted from five programming languages. The preprocessing method is applied to remove the noisy words, characters and symbols and to get to tokens that can be used for plagiarism detection analysis. The LSA technique process theses tokens for semantic analysis. To retrieve information from source code first it needs to be converted to tokens' weighting information. It contains the extracted tokens with weighting values that show the contribution of each symbol.

Sensors are deployed in, and every student in the university is using the smartphone. Through this, I may be notifying by the location of every student, their activities, etc. I have deployed three base stations in the area of the university with a number of sensors as shown in figure 2 and sensors are sending the data to the base station as shown in figure 3. The base station is colored with yellow because it's inactive state and sensors send the data keeping the delay of 1 minute or as you want to receive the data. This system is deployed in the Al-Balqa Applied University to maintain a check and balance on every student and further to update the activities of every student.

The Internet of things (IoT) describes the network of physical objects—"things"—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the Internet.

Things have evolved due to the convergence of multiple technologies, real-time analytics, machine learning, commodity sensors, and embedded systems.Traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others all contribute to enabling the Internet of things. In the consumer market, IoT technology is most synonymous with products pertaining to the concept of the "smart home", including devices and appliances (such as lighting fixtures, thermostats, home security systems and cameras, and other home appliances) that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smartphones and smart speakers. IoT can also be used in healthcare systems.

There are a number of serious concerns about dangers in the growth of IoT, especially in the areas of privacy and security, and consequently industry and governmental moves to address these concerns have begun including the development of international standards.

V. APPLICATIONS

IoT in Healthcare

- Provides Real Time Data
- Makes Devices Smarter
- Provides Superior Analytics

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IoT in Smart Cities

- Innovative Solution to Traffic Congestion
- Energy-efficient Buildings
- Improved Public Safety

IoT in Agriculture

- Precision Farming
- Smart Irrigation
- Smart Greenhouse

IoT in Industrial Automation

- Software Defined Network
- Service Management Tools Security
- Compute Storage Analytics

IoT in Disaster Management

- More diverse and rich data sources
- Alternative communications network availability
- Lesser computational cost

VI. FUTURE SCOPE

Energy efficient algorithmsNeed to be designed forSystems to be active longer.We need informationSeclusion methods toSecure data and privacy.We need to reduce the gapBetween machine real-timeAnd actual real-time.The future of IoT is billion of cheap, small, low-powered devices that provide real-time system that's important to a given organization.It's invisible, ubiquitous and primarily driven by notifications.

VII. CONCLUSIONS

The Internet of Things has connected peoples, things, processes and data together through network connection.Finally before IoT be a reality,it is necessary that devices of onebrand, with a proprietarytechnology, are able to talk toanother brand's devices And organization need to come toa consensus on an international standard of compatibility.

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