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CHUI Based Policy Prediction and Image Search on Content Sharing Sites

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ABSTRACT: User can share their personal information like images with other users through content sharing sites. Unfortunately the privacy of uploaded images in content sharing site become a major problem. To overcome this problem CHUI based Privacy Policy Prediction framework and NPK for privacy policy based image search are introduced . CHUI (Closed High Utility Itemsets) based Framework determines the best privacy policy for the uploaded images and NPK (Non-Parametric Kernel) for image search in secure way.

KEYWORDS: CHUI ,NPK

I. INTRODUCTION

A privacy policy [10] is a declaration or a lawful document in privacy law. It discloses some or all of the ways a party gathers, uses, discloses, and manages a customer data. It fulfils a legal requirement to protect a customer privacy. Personal information can be used to identify an individual, including name, address, photos , date of birth etc.

Content Sharing [9] refers to the planned distribution of content across appropriate social media such as Twitter, LinkedIN, Facebook [13] and Google +.

Photo is an image. Sharing images are major hobby of members in content sharing sites. Normally the shared images can be accessed by friends as well as strangers due to the flaws in privacy settings .This may lead to exposure of personal information. That is aggregated information can be misused by malicious users.

To avoid such kind of unnecessary exposé of personal images, privacy settings are required. Nowadays such privacy settings are available but maintaining these measures is a tedious and error prone process.

CHUI [3] based Privacy Policy Prediction system and NPK [2] based image search are introduced to overcome this problem .It provides users with an experience of free privacy settings by automatically generating personalized policies and policy based image search.

II. RELATED WORK

Earlier systems shows different studies on automatic assignment of the privacy settings. One such system is Bonneau et al.[4] which projected the concept of privacy suites. It recommends the user's privacy setting with the help of skilled users. The skilled users are trusted friends who previously set the settings for the users.

Danezis [5] introduced an automatic privacy extraction system . Clusters of friends was proposed by Adu-Oppong et al. [6] based on the concept of "social circles". Location-based user privacy was predicted by Ravichandran et. al[7]. This was done on the basis of time of the particular day and location . The study of whether the keywords and captions used for tagging the photos of user can be used more efficiently to create and maintain access control policies was done by Klemperer et al[8]. That is a tag based access control of data in the content sharing sites. Photo tags can be classified as managerial or unrestrained based on the user needs. Social circle based privacy setting was developed by FabeahAdu-Oppong [6] . It facilitates a web based description to secure personal information. Social Circles Finder technique automatically construct the friend's list. Social circle of a person and concentration of his relationship are

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studied and privacy policies are set in this technique. Privacy-Aware Image Classification is introduced by Sergej Zerr[11].

Adaptive Privacy Policy Prediction [1] system is introduced by Anna Cinzia Squicciarini ,Dan Lin ,Smitha Sundareswaran and Josh Wede .The A3P system provides policy based on the user uploaded images . User's individual characteristics , content and metadata of uploaded images are considered for the policy prediction in the A3P system. A3P Core and A3P Social are main two component of A3P System. When a user uploads a data like image, the image will be first sent to the A3P-core. The A3Pcore organizes the image and resolves whether there is a need to appeal the A3P-social. Mistaken of privacy policy prediction in uploaded images is the disadvantage of A3P system.

III. PROPOSED SYSTEM

To improve efficiency of privacy policy prediction in uploaded images CHUI based privacy policy prediction is proposed .NPK based image search is proposed for policy based image search. Each block of the proposed architecture is vital. User can upload image. The uploaded image undergoes image classification. If there is any need of A3P Social, A3P Core accesses it. Otherwise Policy prediction is established. Proposed architecture is shown in figure1.A3P Based predicted policy as well as CHUI Based predicted policy and NPK based image search are shown in figure 1.

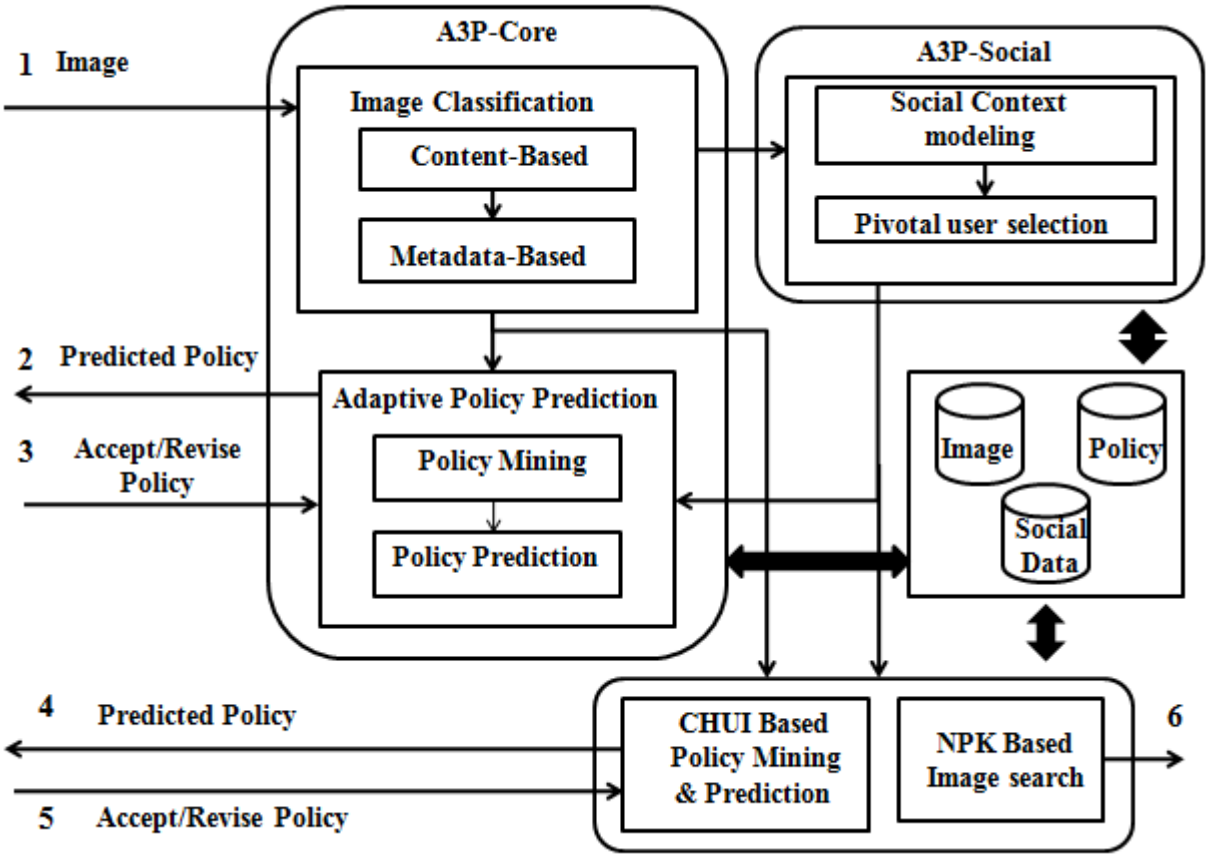

Figure 1: Architecture

Proposed system only consider JPEG and PNG format of uploaded image.
The proposed architecture consists of following blocks:

1) A3P Core
2) A3P Social

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3) Database
4) CHUI Based policy mining and policy prediction
5) NPK Based image search

1.A3P Core

The A3P Core contains two major blocks of the framework.
1. Image Classification
2. Adaptive Policy Prediction

Every image of the user gets classified based on content and metadata .Then its privacy policies are generalised. This approach provides the policy recommendation easy and more accurate way.

1.1.Metadata Based Image Classification

The images are groups into sub-categories in metadata based Image classification. Following steps describe the metadata based image classification.
Step 1 : Keywords are important .It is obtained from the metadata of the image. Metadata includes Tags, Comments and Captions. From these Tags, Comments and Captions keywords are obtained. After obtaining the keywords, identify all nouns, verbs and adjectives and store them into a metadata vector such as
Tnoun={t1,t2,t3,…..,ti}
Tverb={t1,t2,t3,…..,tj},
Tadjective={ t1,t2,t3,…..,tk} where i,j and k are the total number of nouns, verbs and adjectives respectively.
Step 2 :Achieve a typical hypernym from each metadata vector. The hypernym is denoted by h and first retrieved for every ti. Vector form of hypernym and frequency are the normal representation of hyprnym. And select the hypernym with the highest frequency.
Step 3 :Obtain the subcategory in which the image fits in. Incoming new image, the space between these hypernyms and each category is computed and the closest subcategory for that image is discovered.

1.2. Content Based Image Classification

Content-based classification is efficient and accurate image similarity approach. Classification algorithm compares image signatures. The wavelet transform encodes frequency and spatial information related to image colour, size, invariant transform, shape, texture, symmetry of each image. Small number of coefficients are selected to form the signature of the image. The content likeness among images is then determined by the distance among their image signatures.

1.3. Adaptive Policy Prediction

Policy mining and Policy prediction are subpart of Adaptive Policy Prediction
Policy Mining: Policy mining deals with mining of policies by applying different association rules and steps.
Policy Prediction: Based on the strictness level , best policy for the user is chosen. Strictness level decides how "strict" a policy is .It is by returning an integer value. To attain high strictness strict value should be minimum.

2. A3P Social

The A3P-social related to the user's social context and his general attitude toward privacy. A3P social will be invoked by the A3P-core when the system notices significant changes of privacy trend in the user's social circle.

3. Database

Database contain user uploaded images , set of policies and social data.

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4. CHUI Based policy mining and prediction

CHUI(Closed High Utility Itemsets) Based policy prediction is proposed. Itemsets are generated from the metadata of image . Closed high utility itemsets are generated using minimum utility threshold. Utility computation of the itemsets does not produce candidate. CHUI Based policy mining and prediction automatically generate a policy for each newly uploaded images ,according to user's social features.

5. NPK Based image search

NPK (Non-Parametric Kernel) learning technique based image search is proposed. Textual and visual contents of social images ,CHUI Based policy are combined to produce fantastic image search .

When user uploaded an image , select Subject ,Action ,Condition for that uploaded image. Subjects are Friend, Family, Co-worker and Stranger . Actions are View ,Tag ,Comment and Download .Conditions are Location ,Age and Date. User select Subject Family ,Action View and Condition Date 2017 for uploaded image ,only the family member of the user can view the uploaded image upto 2017.
CHUI Based policy prediction automatically predict policy for newly uploaded image. Based on the proposed architecture, an example is shown in below Table 1 . User upload an image , CHUI based policies for that image are

Choose Policy	Family	Friend	Co-worker	Stranger	Image View	Image Tag	Image Comment	Image Download	Date	Location	age
Choose Policy	YES	NO	NO	NO	YES	NO	NO	YES	_	Kannur	_
Choose Policy	YES	NO	NO	NO	YES	YES	NO	YES	2017	Kottayam	_

Table 1:CHUI Based Policy Prediction

User can choose any of the policy or revise the policy.

Kids ,Animal ,Scenery and Explicit are image categories. When uploading an image , user select any of the category . NPK and CHUI Based policy provide good image search experience for user. User input a search query "baby " both NPK and CHUI policy satisfied images are retrieved , it is shown in below Figure 2.

Figure 2: Image Search Result

"View" in the Action list of Uploaded image is only getting as search result. Even though Subject and Condition of the uploaded image are matched and Action is not "View" , then the search result is empty.NPK provides image search based on both textual and visual similarity of image and CHUI based policy. So that a good searching experience is established.

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IV. EVALUATION

Based on the experimental evaluation, out of 20 images uploaded CHUI Based policy prediction automatically predict accurate policies than A3P.CHUI Based policy prediction take minimum time for predict policy than A3P.CHUI Based policy prediction list more policy than A3P.The detailed description is shown in Table 2,Table 3 and Figure 3 ,Figure 4.

In this evaluation, check the performance of CHUI Based policy prediction and A3P in terms of number of policies and time taken for the policy prediction. To facilitate, upload same image and then compare how much policies are obtained in CHUI Based policy prediction and A3P ,compare how much time taken for the policy prediction in CHUI Based and A3P.

Trial No	A3P Based	CHUI Based
1	0	2
5	0	2
10	2	2
15	0	2
20	1	2

Table 2 : Evaluation Based On Number Of Policies

Table 2 shows the performance of CHUI Based policy prediction and A3P in terms of number of policies for the same uploaded image. Trial No is considered as image no. For 1'st uploaded image , A3P shows 0 policy where as CHUI Based policy prediction shows 2 policies. .For 5'th uploaded image, A3P shows 0 policy where as CHUI Based policy prediction shows 2 policies. .For 10'th uploaded image A3P shows 2 policies where as CHUI Based policy prediction shows 2 policies. .For 15'th uploaded image A3P shows 0 policy where as CHUI Based policy prediction shows 2 policies. For 20'th uploaded image A3P shows 1 policy where as CHUI Based policy prediction shows 2 policies .Based on Table 2, Figure 3 is plot. In Figure 3, X coordinate shows Trial No. Y coordinate shows number of policies. Efficiency of CHUI Based policy prediction is higher than A3P in terms of number of policy prediction. User can search image based on CHUI policy also. So that while comparing with previous model, proposed model give efficient searching result and accurate policy. From the Figure 3,easy to understand that CHUI Based policy prediction are fixed ,where as A3P is vary. From the evaluation, it can be stated that performance of CHUI Based policy prediction is efficient than A3P. Search results are also relevant.

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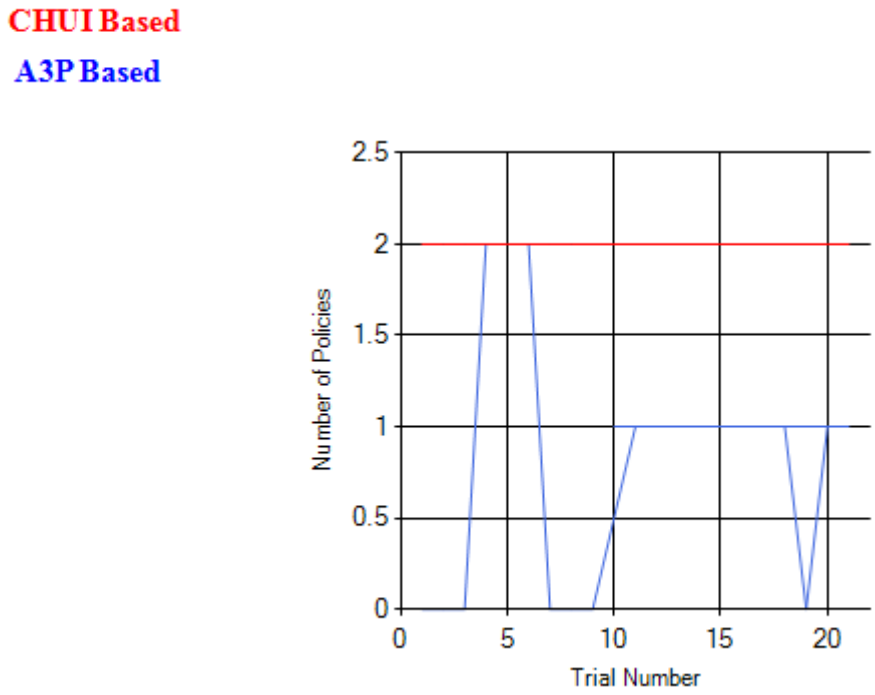

Figure 3: Comparison of A3P and CHUI Based policy prediction in terms of number of policies.

Table 3 shows the performance of CHUI Based policy prediction and A3P in terms of time taken for the policy prediction of same uploaded image. Trial No is considered as image no. Based on Table 3, Figure 4 is plot. In Figure 4, X coordinate shows Trial No. Y coordinate shows time taken for the policy prediction in seconds. Efficiency of CHUI Based policy prediction is higher than A3P in terms of time taken for the policy prediction. User can search image based on CHUI policy also. So that while comparing with previous model, proposed model give efficient searching result and accurate policy within seconds.

Trial No	A3P Based	CHUI Based
1	1.000000000000000	.000000000000999
5	1.000000000000000	.000000000087569
10	87.96003100000000	.000000000000997
15	0.271015500000000	.000000000087569
20	1.431081800000000	.000000000000999

Table 3 : Evaluation Based On Time

From the Figure.4, CHUI Based policy prediction are take less time for policy prediction than A3P.

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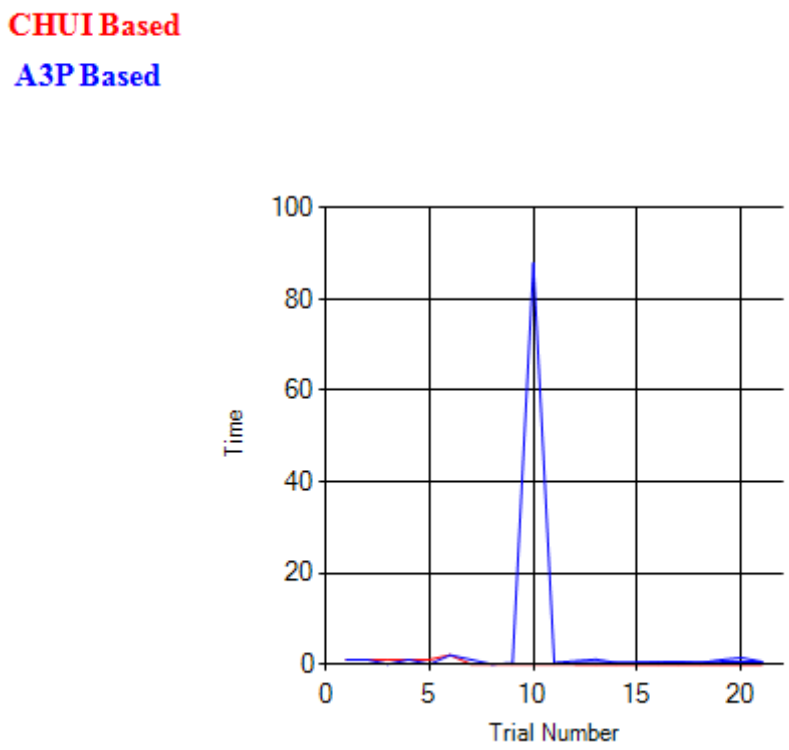

Figure 4: Comparison of A3P and CHUI Based policy prediction in terms of time taken for the policy prediction.

V. CONCLUSION AND FUTURE WORK

Comparing with previous model CHUI Based policy prediction can give relevant policy and good image search result. CHUI Based policy prediction determines the best available privacy policy for each newly uploaded image. Both textual and visual based image search exists , which lead to unwanted disclosure and privacy violations. To overcome this problem NPK and CHUI Based image search is proposed.NPK and CHUI Based policy provide good image search experience .So declare that efficiency of the policy prediction and image search of proposed model is higher than earlier models.

CHUI Based policy does not support GIF images [12]. In future methods for identifying policy prediction in GIF images can be introduced. Then it will be one of the efficient model in user uploaded images on content sharing sites in a secure way.

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BIOGRAPHY

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