AI Patent in China

Lili WU

March 28-29

Agenda
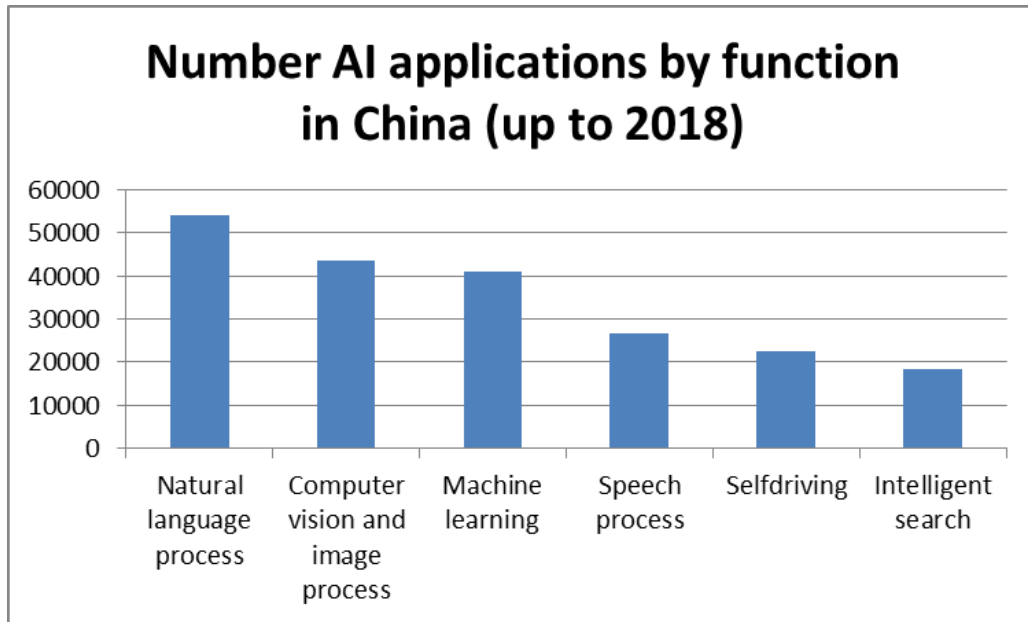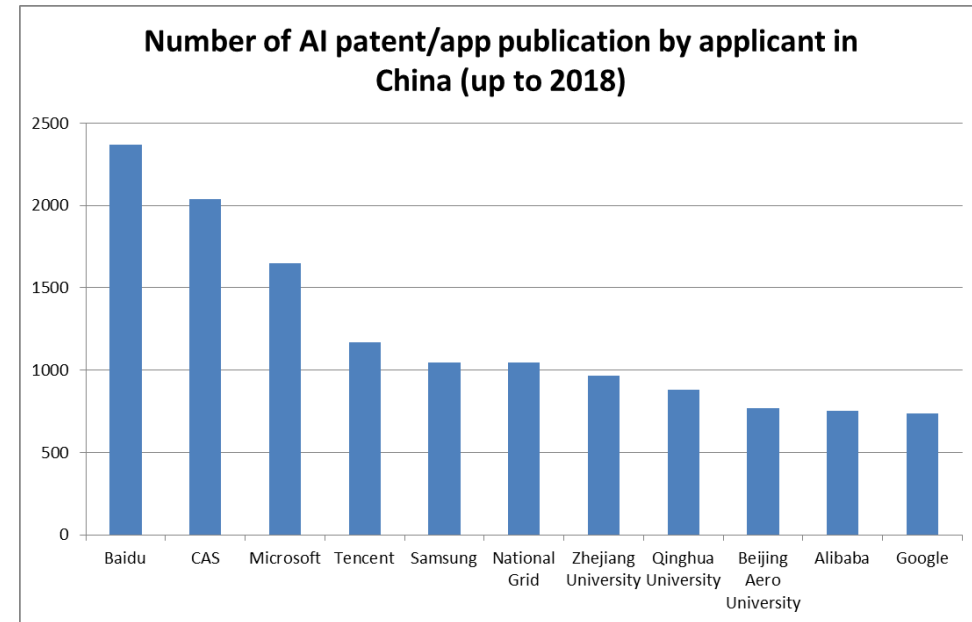
- General Introduction of AI in China

- Legal regulations of AI

- Issues to be considered

Computer vision and machine learning are hot fields

Chinese companies filed a lot of AI applications

Number AI applications by function in China (up to 2018)

Number of AI patent/app publication by applicant in China (up to 2018)

Source: http://www.ppac.org.cn/news/detail-38.html

ICT companies are main applicants in computer vision and image process

Rank	Applicant	Number of application publications
1	Chinese Academy of Science	390
2	**Oppo**	323
3	**Xiaomi**	304
4	**Baidu**	283
5	**Tencent**	262
6	**Samsung**	231
7	**Sony**	211
8	Xidian University	200
9	University of Electronic Science and Technology	194
10	**Lenovo**	174

Source: http://www.ppac.org.cn/news/detail-38.html

Universities are main applicants in machine learning

Rank	Applicant	Number of applications
1	**CAS**	886
2	Baidu	844
3	**Zhejiang University**	449
4	National Grid	422
5	**Qinghua University**	403
6	**South China University of Technology**	379
7	**Xidian University**	316
8	Tencent	314
9	**University of Electronic Science and Technology of China**	312
10	**Tianjing University**	293

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Story of AI Computer Vision Company

Market value of Sensetime is over 6 billion USD！

Number of invention applications

Year	Value
2013	4
2014	15
2015	38
2016	108
2017	199
2018	284
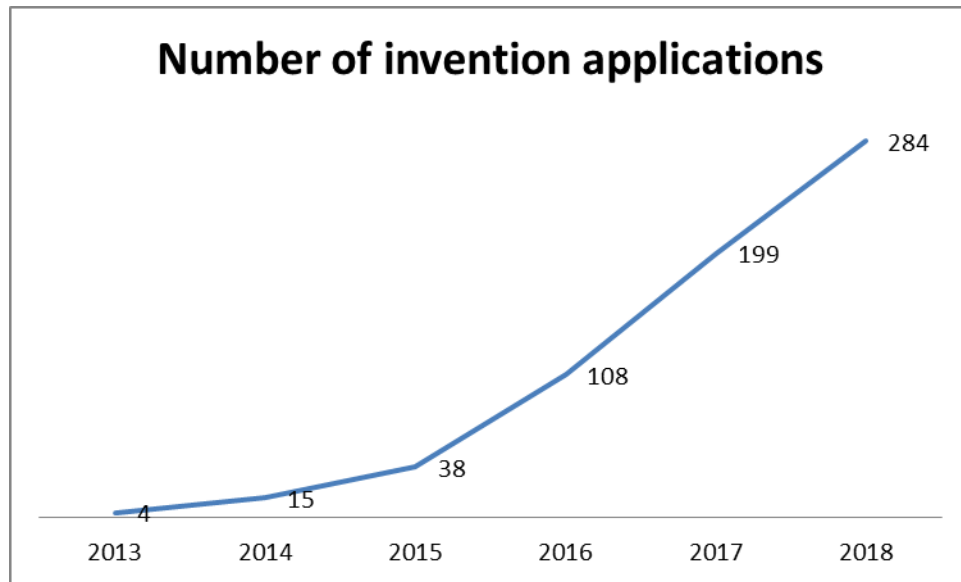
Intelligent city

Intelligent finance

Intelligent shop

Face ID

Sense AR

Story of AI Computer Vision Company

Patent examples of Sensetime: More implementation patents; less training patents

No.	Title	Group	Publication	Issue date	Application Date
1	Authenticating method and apparatus for living body	Face application	CN105426827B	2019/3/8	2015/11/9
2	The gesture detection network training, the gesture detection and control method, system and terminal	Model training	CN107341436B	2019/2/22	2016/8/19
3	Face recognition method and system	Face application	CN107004115B	2019/2/15	2014/12/3
4	Multi-class object detection method and system	Selection application	CN106688011B	2018/12/28	2014/9/10
5	Image pre-background segmentation and model training, Image processing method and apparatus	Model training	CN107341805B	2018/11/23	2016/8/19
6	A queuing status information detection method and system thereof	Queue application	CN105139040B	2018/11/20	2015/10/13
7	Super-resolution providing apparatus and method	Image process	CN106796716B	2018/11/16	2014/8/8
8	A multi-screen signing system	Face application	CN106127876B	2018/11/6	2016/6/23
9	For based on multi-task of the face key point detection method and system	Face application	CN106575367B	2018/11/6	2014/8/21
10	A attendance method and system	Intelligent operation	CN105913507B	2018/10/12	2016/5/3
11	The face attribute for predicting method and apparatus	Image process	CN107004116B	2018/9/21	2014/12/12
12	Scene text detection system and method	Text process	CN106796647B	2018/9/14	2014/9/5

Allowable Claims for AI

Method	✓
Apparatus comprising: means for …	✓
Device comprising: processor + hardware (other than memory)	✓
Device comprising: memory + processor + instructions stored in memory and executed by processor	✓
Computer readable medium having instructions stored thereon	✓
Computer programs	✗
Signal, Data structure, Energy	✗

■ An AI related invention is usually regarded as patentable if

– If it uses technical means (low bar)

– Solve technical problem (relative high bar)

– if the effect obtained can be objectively and physically measured by human beings (relative high bar)

■ Pure AI algorithm, if not specifically applied to a specific scenario, is NOT patent eligible

- Sensetime patent CN107341436B, issued March 8, 2019 (Patent in training step)

- (Patentable)The **gesture** detection **network training** method, comprises the following steps :

training a first convolutional neural network according to a sample image containing human hand tagging information to obtain the prediction information of the human hand candidate regions of the first convolutional neural network to the sample image;

correcting the prediction information of the human hand candidate regions, by inputting the predication information into a third convolutional neural network; and

training a second convolutional neural network according to the corrected prediction information of the human hand candidate regions and the sample image, wherein the second convolutional neural network and first convolutional neural network share a feature extraction layer, and the parameters of the feature extraction layer are kept unchanged in the training process of the second convolutional neural network.

Technical problem: there is no effective way to detect gestures of human beings.

Technical means:

Technical effect: According to the embodiment of the invention, the accuracy of training the second convolutional neural network is improved; the false detection rate of the gesture detection by means of the second convolutional neural network is further reduced; the convenience for training the second convolutional neural network is provided; and the calculation amount of training the second convolutional neural network is reduced.

- (Not patentable)An optimization method for convolutional neural network, characterized in that comprising the following steps:

step 1: Input L*K samples through a computer, wherein L is the number of samples, K-1 is the number of input vectors, and Column K is the output vector;

step 2: Process said samples, and delete the gross error with HBFCM;

step 3: Perform the clustering with the input column as the basic unit according to the correlation distance algorithm;

step 4: Construct the convolutional neural network model for the subsequent training;

step 5: Train said convolutional neural network model with said L*K samples, and further verify such training result;

step 6: Input the data to be evaluated after training said convolutional neural network model, and said data to be evaluated is the normalization processed data;

Step 7: Evaluate said data with said convolutional neural network model, and output the result.

Comments:

The external object to be processed by using computer program is the abstract data samples; and the problem to be solved is a mathematic problem, i.e., the algorithm's optimization, which is not a technical problem.

The solution is to perform the numerical calculation through the computer program which fails to solve the technical problem, and thus does not include the technical means in conformity with the laws of nature.

The effect achieved by this solution is only to optimize the algorithm and does not contain any technical effects.

■ Invalidation appeal regarding AI invention between Shanghai Zhizhen and Apple (2012-now, retrial in the Supreme Court in China)("SIRI")

Claim 1: a chatting robot system, comprising at least:

a user, and a chatting robot having an artificial intelligence (AI) server with an AI and information service function and a corresponding database, the chatting robot also having a communication module, the user performing various conversations with the chatting robot through an instant communication platform or SMS (Short Message Service) platform,

characterized in that the chatting robot further has a query server, a corresponding database, and a game server, and the chatting robot is provided with a filter for distinguishing whether user sentences received by the communication module are formatted sentences or natural language, and forwarding the user sentences to the corresponding server based on a distinguishing result, the corresponding server including the AI server, the query server or the game server.

Court opinion:

– *However, the description only recites there is a game server and mentions a concept of realizing interactive games, but it does not recite at all how to connect the game server with other components of the chatting robot.*

– *Hence, the description of the subject patent fails to sufficiently disclose how to realize the game function defined in claim 1 of the subject patent and therefore, the subject patent shall be announced as being* *invalid*.
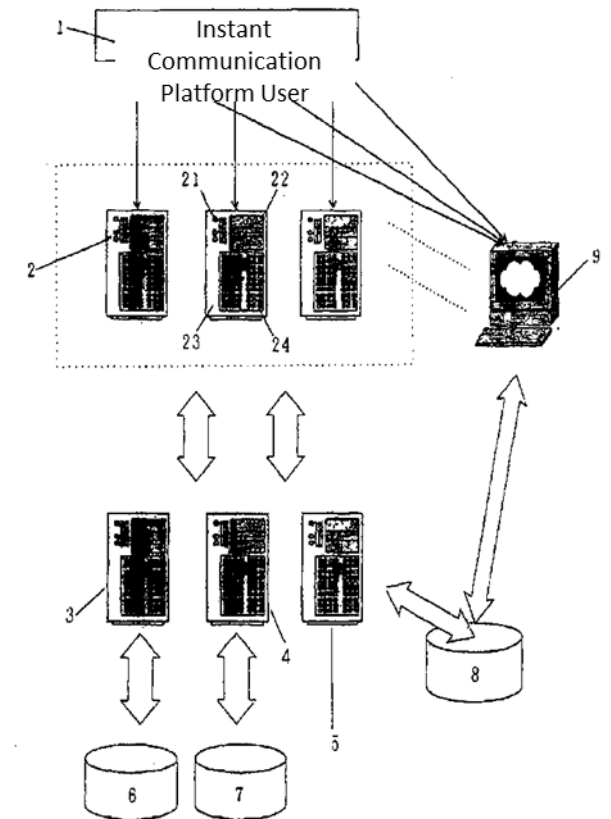
Issues in the flow of AI applications

1. Sufficient disclosure
2. TS v. patent
3. Inventorship

1.Data collection
2. Sample data selection
3. Feature selection
4.Structure of Model change
5. Combination of Algorithms
6. Training method
…..

1.Data collection
2. Sample data selection
3. Feature selection
4. AI implementation
…..

Training data → **AI Model**

Actual data

Actual Implementation
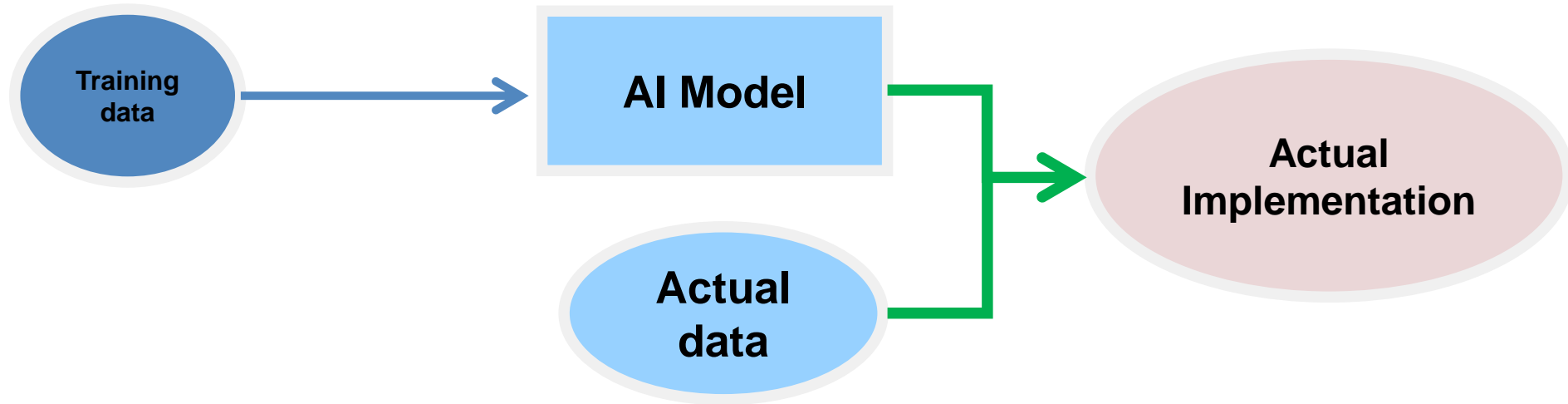
THANKS

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