

**AI기술을 활용한 직관적인 안보 위협요소 식별 어플**

**28사단 전차대대 2중대**

**일병 박준수**

**일병 유건우**



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6. **기대효과**



AI 기술을 활용한  
통합 안보 위협요소 식별 어플



# 지뢰 위험국가 대한민국

2020년 9월 계속된 폭우에 전국 3000개 '유실 지뢰' 비상...  
“후방도 안전지대 아냐”

합참, 태풍 유실 지뢰 243발 수거... 북한 목함지뢰도 11발 발견

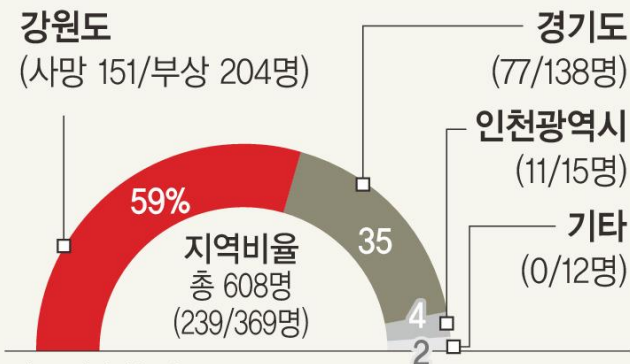
## 한강변 지뢰 터져 낚시객 증상

2020년 7월 4일 오후 6시 49분쯤 고양시 덕양구 행주외동 김포대교 인근 한강 변에서 북한군이 사용하는 대인지뢰가 터져 70대 남성 증상...

## 철원서 대전차 지뢰 폭발 사고 1명 사망



### 민간인 지뢰피해자 집계 (2018년 5월24일 기준)



## 후방지역 미제거 지뢰 현황

매설량(발)	제거	잔여
	5만679	3021

### 경기

평택(안중, 팽성산), 안성, 남양, 가평(호명산), 김포, 성남, 양주(덕정), 파주(법원리), 여주, 고양(벽제), 시흥(군자)

### 충남

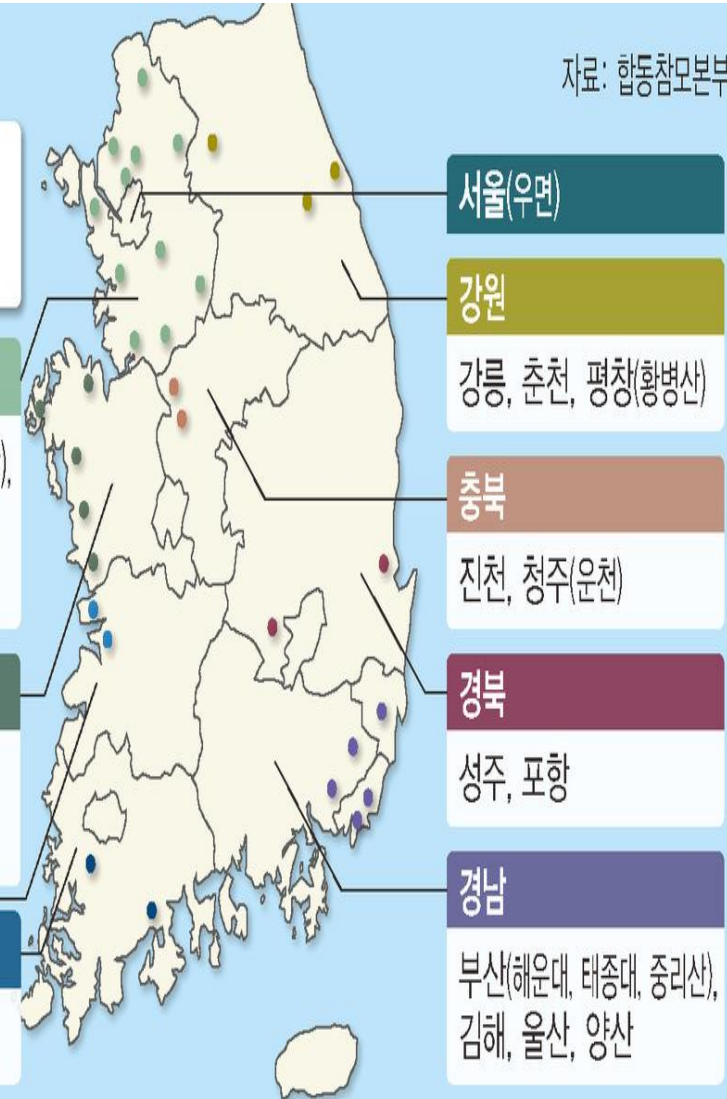
서천(비인), 당진, 홍성(광천), 태안, 보령(대천)

### 전북

군산, 김제

### 전남

나주, 보성(벌교)



## 완전 제거가 불가능한 지뢰

- 지뢰의 높은 불발율과 낮은 제거율
- 토사를 따른 지뢰의 이동

지뢰를 빠르게 식별하고

신고할 수 있는 시스템이 필요

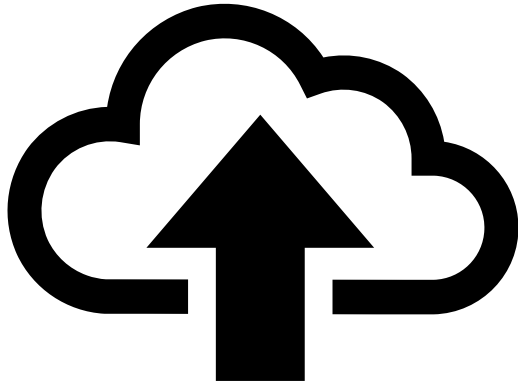
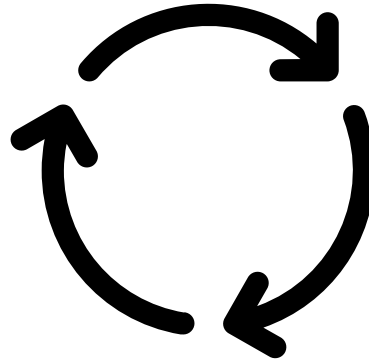


사진 업로드



지뢰 식별



지뢰 신고

One-Stop Service

# Website & APP 제작

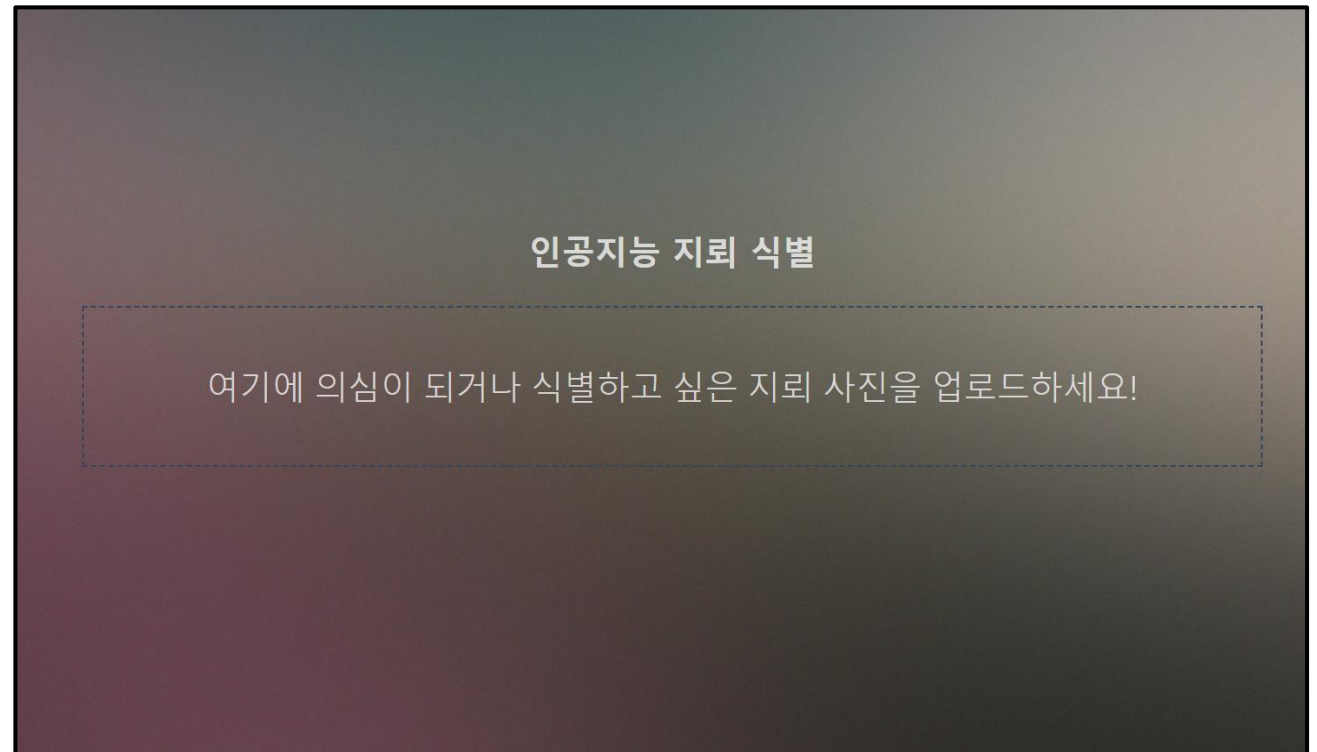
다양한 opensource를 활용하여 제작

The logo for CodePen, featuring a stylized 'C' followed by a hexagonal icon with internal lines, and the word 'PEN' in a sans-serif font.The logo for HTML5 UP, with 'HTML5' in white and 'UP' in a lighter shade of white, set against a solid red rectangular background.The logo for Disqus, featuring a white speech bubble icon with a 'D' inside, and the word 'DISQUS' in white capital letters below it, all on a blue background.The logo for ProProfs, with 'ProProfs' in a bold blue font and 'Delightfully Smart Tools' in a smaller blue font below it, all within a white rectangular border.

# 1. 지뢰 식별 PAGE



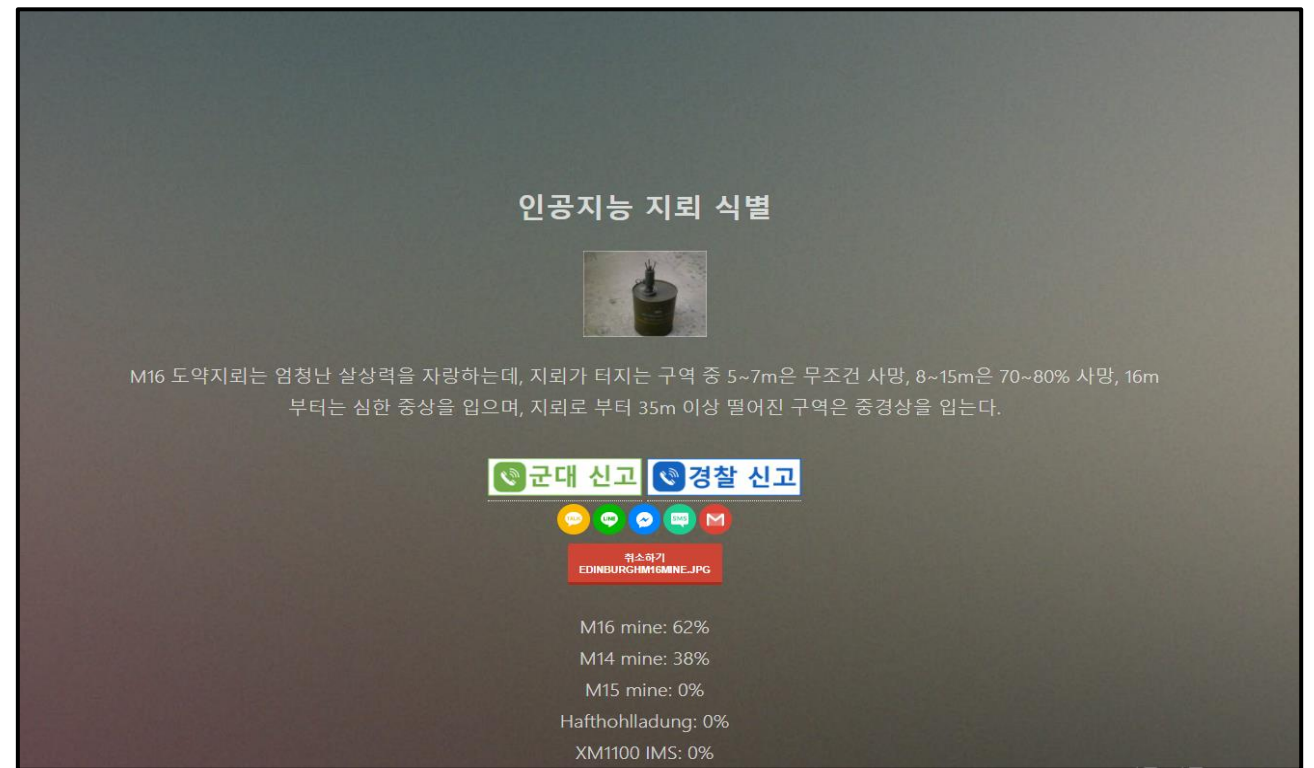
신속하고 간단한 지뢰식별 프로세스



# 1. 지뢰 식별 PAGE



## 신속하고 간단한 지뢰식별 프로세스

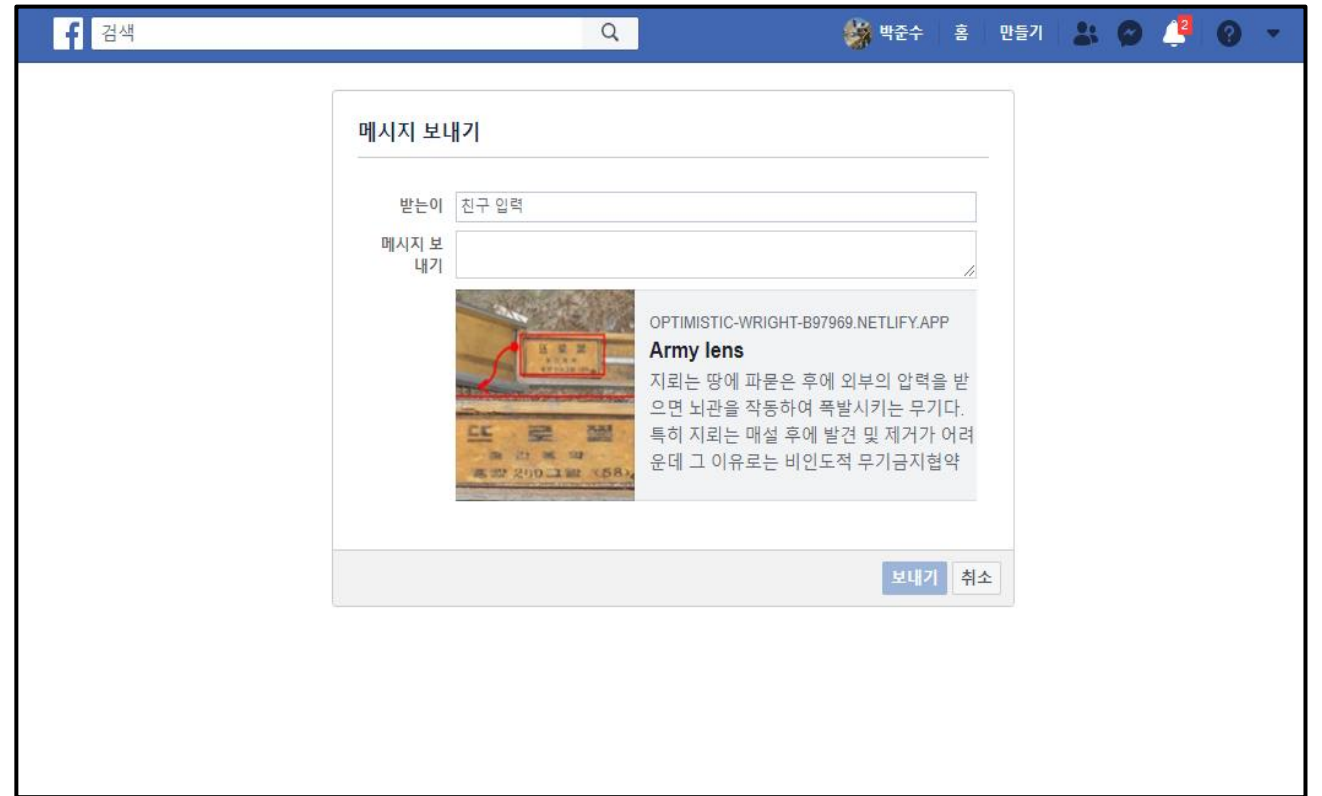




# 1. 지뢰 식별 PAGE



## 신속하고 간단한 지뢰식별 프로세스



## 2. 지뢰 종류 PAGE




클릭 한번으로 쉽게 지뢰 관련 전문지식에 접근 가능

### 지뢰 종류

지뢰는 땅에 파묻은 후에 외부의 압력을 받으면 뇌관을 작동하여 폭발시키는 무기다.  
특히 지뢰는 매설 후에 발견 및 제거가 어려운데 그 이유로는 비인도적 무기금지협약 이전에 만들어진 지뢰의 경우 플라스틱으로 만들어진 경우가 흔하며, 이로 인해 지뢰 탐지기에 탐지되지 않는 경우가 허다하다.



복합지뢰



M16 도약지뢰



M14 발목지뢰



미니모어



M15 대전차지뢰



M2 SLAM 다목적지뢰

## 2. 지뢰 종류 PAGE



클릭 한번으로 쉽게 지뢰 관련 전문지식에 접근 가능




### 3. 사고 사례 PAGE

지뢰에 대한 경각심을  
일깨워주는 다양한  
사고사례 제공

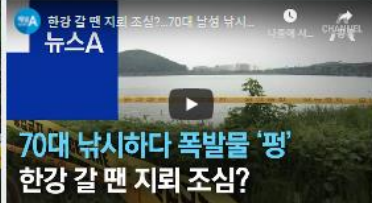

-아래 링크를 클릭하여  
관련 뉴스확인 가능-

사고 사례



지뢰는 그 위력도 무시할 수 없지만, 불발률이 높고, 광범위한 지역에 매설되어 있어 완전 제거가 어렵다는 점에서 더욱 위험한 무기체계이다.

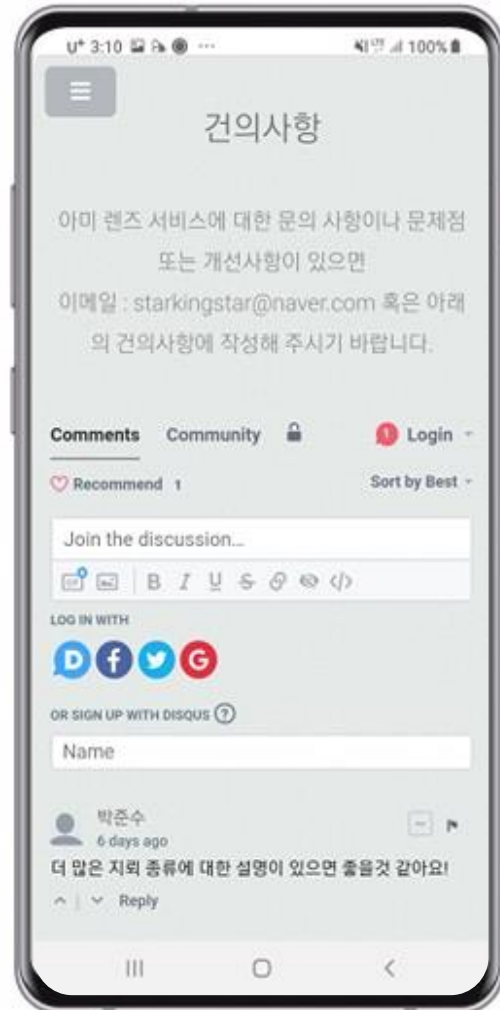
6.25 전쟁 당시 한반도 전역에 매설된 후 제거하지 못한 유실 지뢰로 인하여 매년 인명손실, 환경보존의 저해 요소 등 각종 문제가 야기되는데 국내의 경우 매년 1건 이상의 지뢰에 의한 피해가 발생하고 있다.



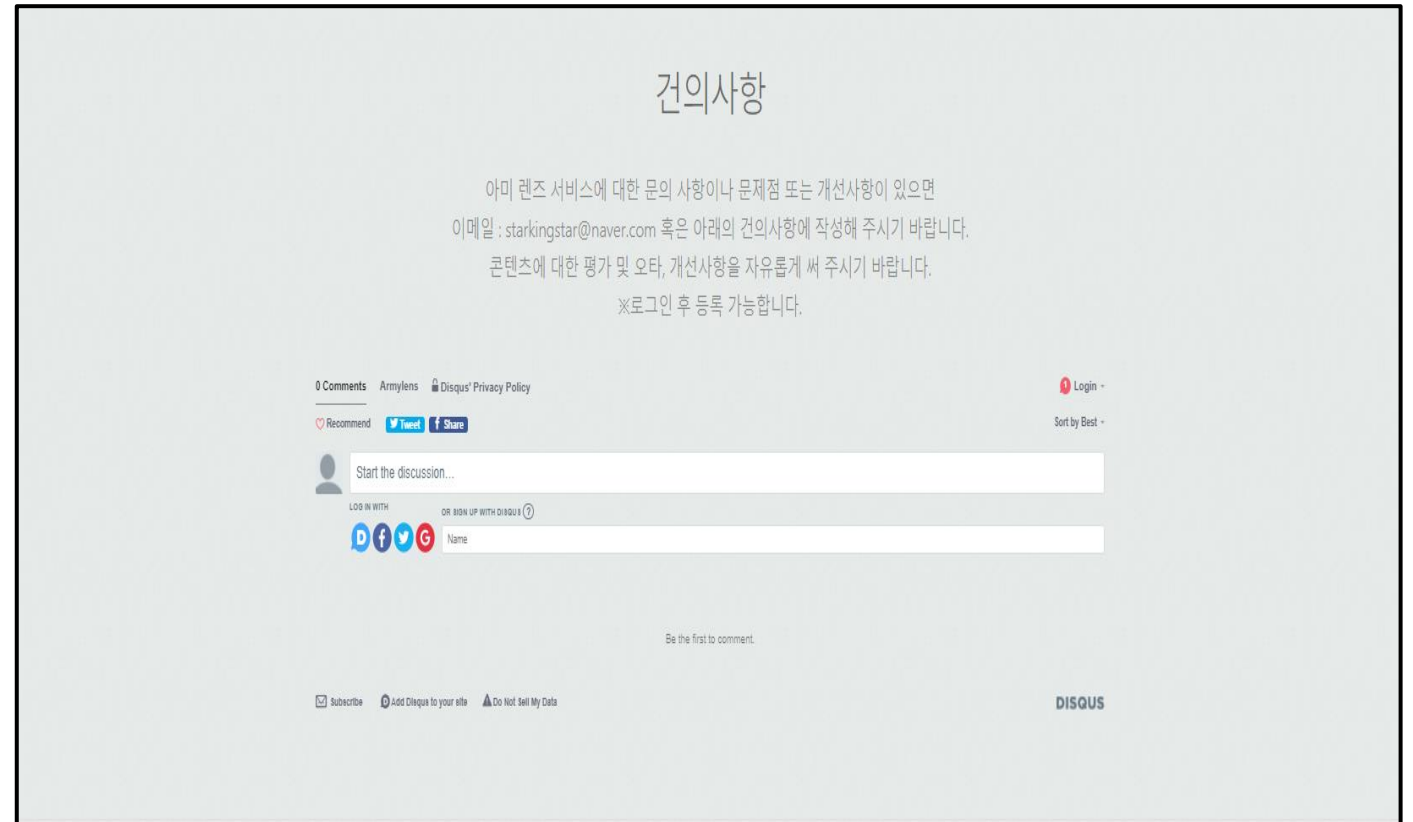




## 4. 건의 사항 PAGE



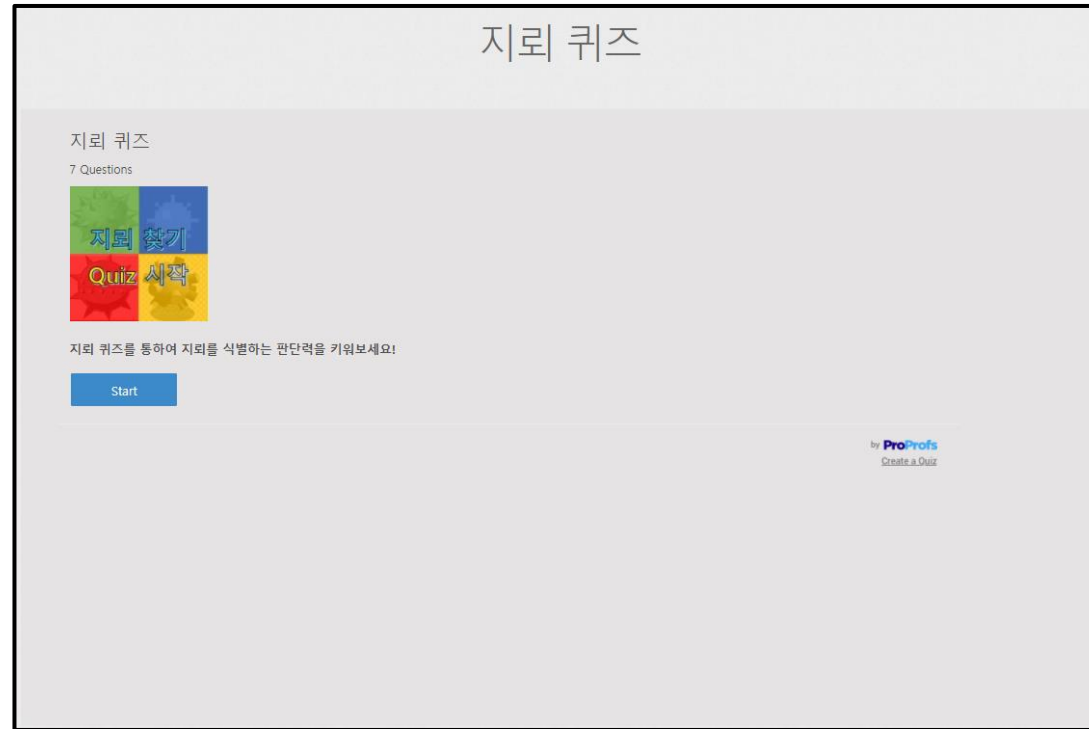
이용자는 건의사항을 통해 개발자에게 아이디어 건의 가능



## 5. 지뢰 퀴즈 PAGE

퀴즈를 통해 학습하며  
효과적인 지식 습득

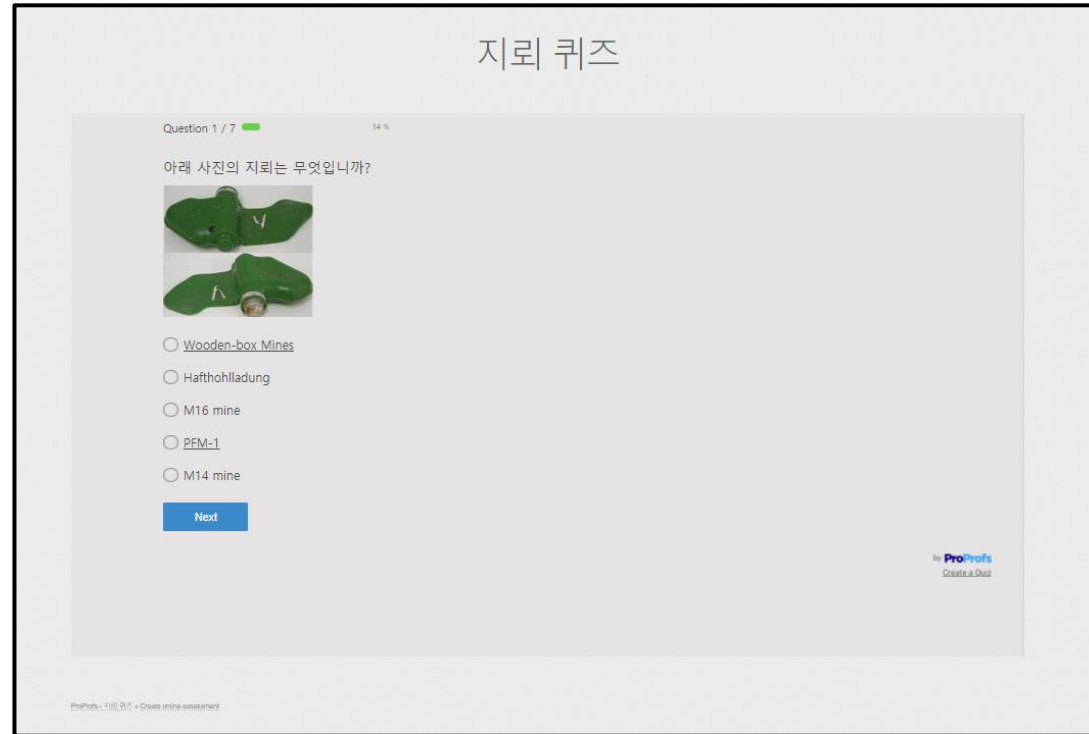
-7개의 랜덤 문제와 오답노트 제공-



## 5. 지뢰 퀴즈 PAGE

퀴즈를 통해 학습하며  
효과적인 지식 습득

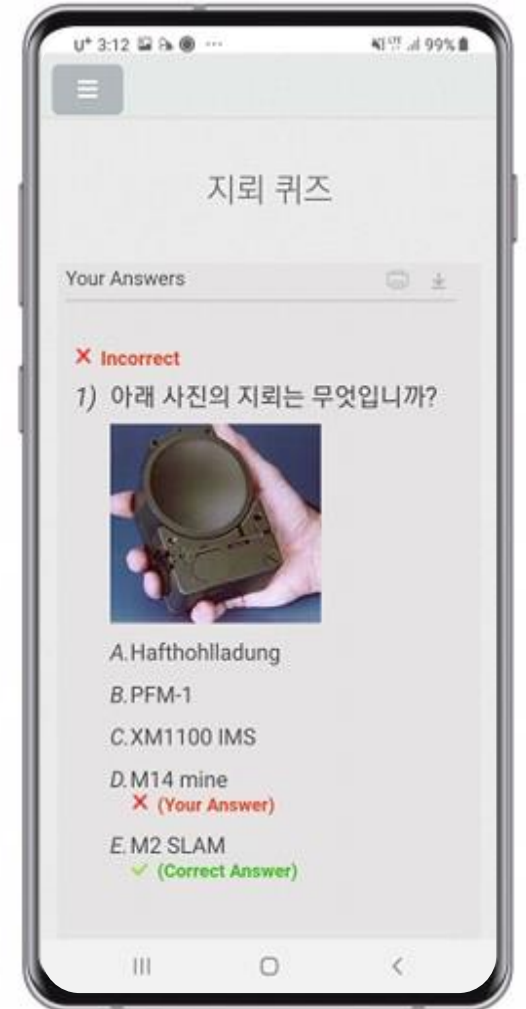
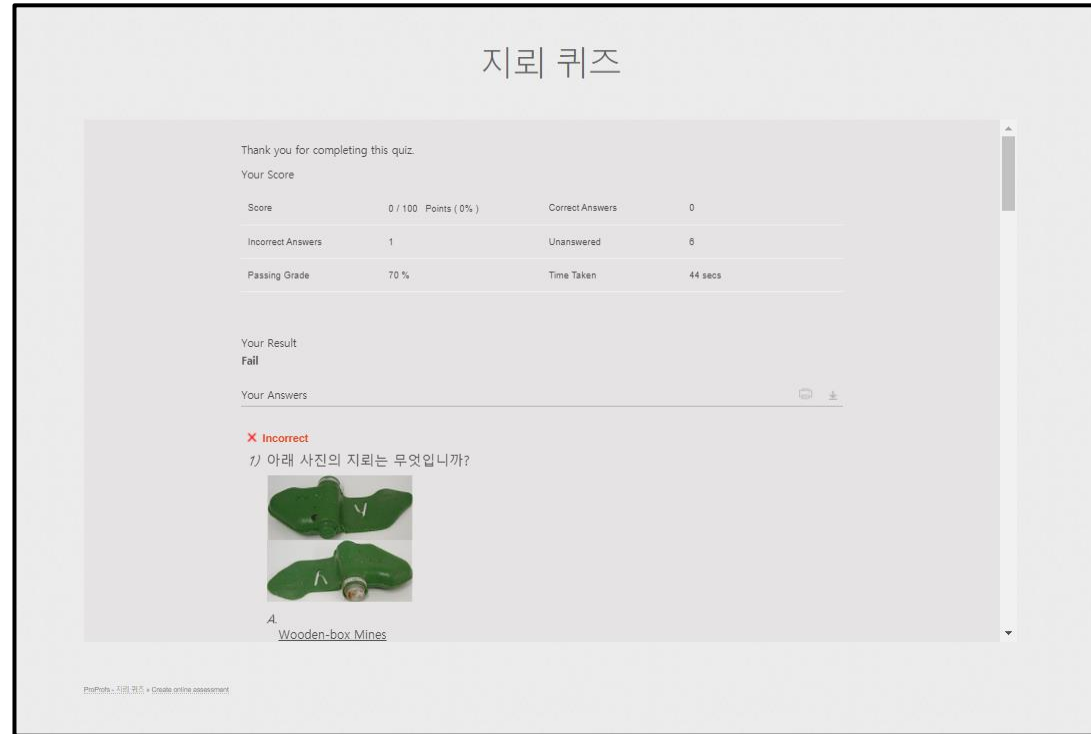
-7개의 랜덤 문제와 오답노트 제공-



## 5. 지뢰 퀴즈 PAGE

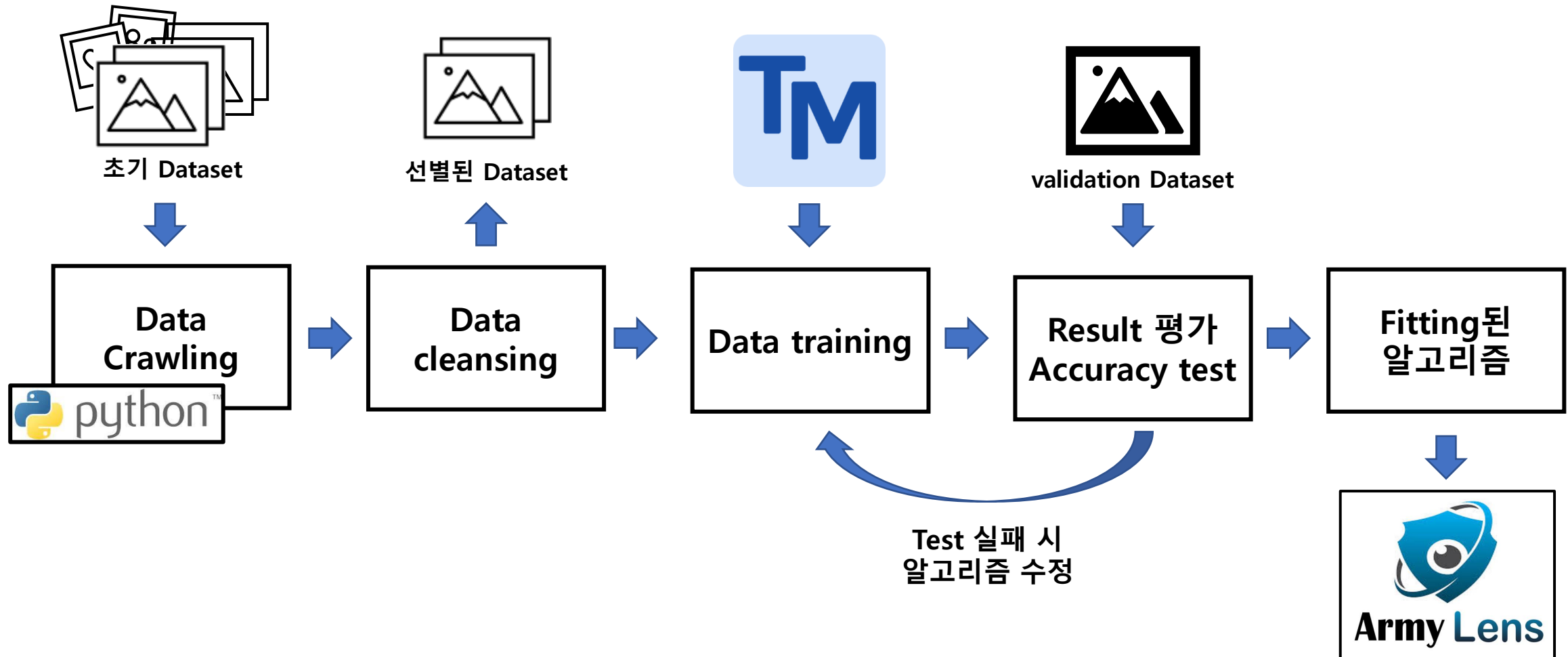
퀴즈를 통해 학습하며  
효과적인 지식 습득

-7개의 랜덤 문제와 오답노트 제공-





# AI Learning Pipeline



## 1. Data Crawling

```

google.py x _main_.py
google.py
1 from google_images_download import google_images_download
2
3 response = google_images_download.googleimagesdownload()
4
5 arguments = {"keywords": "MM-1 Minimore,XM1100 IMS,Hafthohlladung,PFM-1,Wooden-box Mines,M14 mine,M15 mine,M16 mine,M"}
6 paths = response.download(arguments)
7 print(paths)

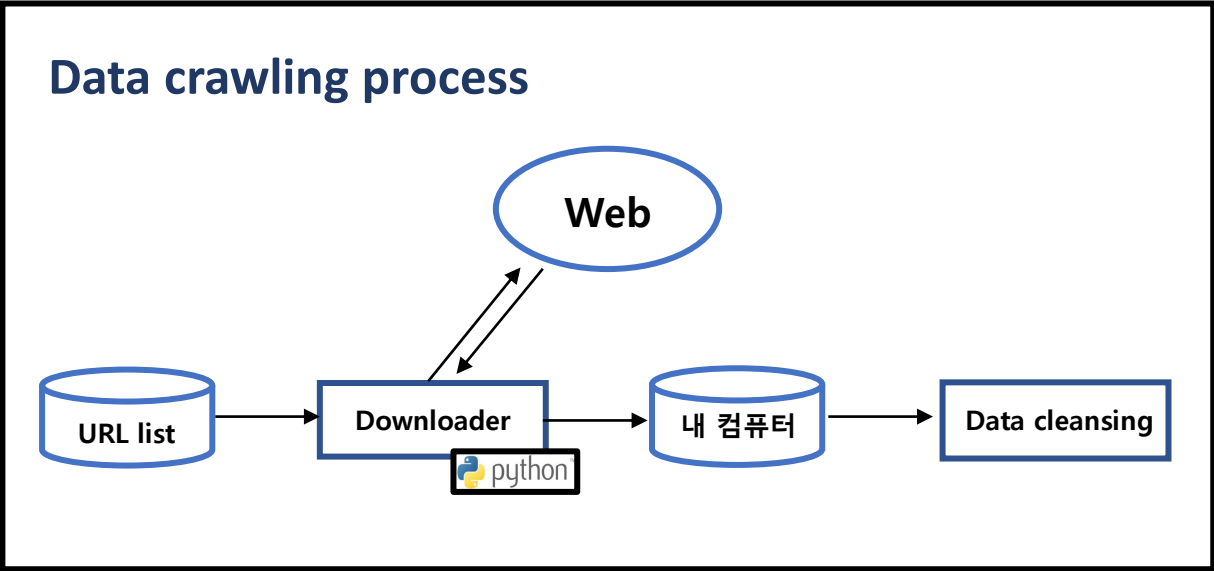
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL 2: Python +
Image URL: https://static.wikia.nocookie.net/armeddassault/images/6/6e/Arma1-landmines-00.png/revision/latest/scale-to-width-down/340?cb=
Completed Image ==> 3.340.png
Image URL: https://minimore.com/images/topics/2018-05/t-1.png
Completed Image ==> 4.t-1.png
Image URL: http://opensourceofrobotics.sakura.ne.jp/robotrecipe/wp-content/uploads/2019/04/mini_extensible_bellow_2.png
Completed Image ==> 5.mini_extensible_bellow_2.png
Image URL: http://opensourceofrobotics.sakura.ne.jp/robotrecipe/wp-content/uploads/2018/04/Screenshot-2018-04-20-at-1.48.29-AM-300x164.png
Completed Image ==> 6.screenshot-2018-04-20-at-1.48.29-am-300x164.png
Image URL: https://upload.wikimedia.org/wikipedia/commons/thumb/0/09/Macleod_Claymore_patent.png/220px-Macleod_Claymore_patent.png
Completed Image ==> 7.220px-macleod_claymore_patent.png
Image URL: https://upload.wikimedia.org/wikipedia/commons/thumb/8/8e/M18_claymore_US_army_drawing.svg/220px-M18_claymore_US_army_drawing.svg
Completed Image ==> 8.220px-m18_claymore_us_army_drawing.svg.png
Image URL: https://static.wikia.nocookie.net/armeddassault/images/7/7e/Arma2-icon-mineeast.png/revision/latest/scale-to-width-down/340?cb=
9
Completed Image ==> 9.340.png
Image URL: https://lasvegas-k9.com/content/images/thumbs/0004821_idc-flag-harness-size-mini-mini-more-flag-patterns-available_550.png
Completed Image ==> 10.0004821_idc-flag-harness-size-mini-mini-more-flag-patterns-available_550.png
Image URL: https://hubtronics.co.ke/wp-content/uploads/2020/06/Mini-Hidden-Spy-Nanny-Camera-Wi-Fi-In-Kenya-smallest-portable-lith-battery-c-body-motion-detection-night-vision-home-2.png
Completed Image ==> 11.mini-hidden-spy-nanny-camera-wi-fi-in-kenya-smallest-portable-lith-battery-1000p-magnetic-body-motion-detection-night-vision-home-2.png
Image URL: https://sites.google.com/site/stingraysworld0explosives/_/rsrc/1264541235882/config/app/images/customLogo/customLogo.gif?rev=
Completed Image ==> 12.customlogo.gif.png
Image URL: https://files.cults3d.com/uploads/blueprint/previews/000/112/433/preview/c27dda9d-9f45-45d5-a900-a845accbf98f.png
Completed Image ==> 13.c27dda9d-9f45-45d5-a900-a845accbf98f.png
Image URL: https://files.cults3d.com/uploads/blueprint/previews/000/112/436/preview/76313ca8-fec1-4817-8cca-af7c26f10c80.png
Completed Image ==> 14.76313ca8-fec1-4817-8cca-af7c26f10c80.png
Image URL: https://books.google.com/books/content?id=3KnBbwAAIAAJ&printsec=frontcover&img=1&zoo=1
Completed Image ==> 15.content.png
Image URL: https://static.wikia.nocookie.net/armeddassault/images/0/02/Arma3-icon-claymore.png/revision/latest/scale-to-width-down/340?cb=
16
Completed Image ==> 16.340.png
Image URL: https://www.fotodevakman.nl/media/catalog/product/cache/4/d09cd47674b2a61189c293841fa89882/1/C/1CCB0405-C066-49F4-A12E-387700213ced.png
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Image URL: https://www.rankuzz.com/microsite/images/libratone-zipp-mini_0_15_600.png
Completed Image ==> 18.libratone-zipp-mini_0_15_600.png
Image URL: https://files.cults3d.com/uploads/blueprint/previews/000/112/430/preview/d7a93cdb-86e5-4d6a-a1a8-13c8339364be.png
Completed Image ==> 19.d7a93cdb-86e5-4d6a-a1a8-13c8339364be.png
Image URL: https://flickerreport.com/wp-content/uploads/2020/10/Screenshot-2020-10-13-at-20.55.25-1024x573.png
Completed Image ==> 20.screenshot-2020-10-13-at-20.55.25-1024x573.png
Image URL: https://i.imgur.com/HRxFPsh.png

```

## Data crawling process

```
graph LR; A[(URL list)] --> B[Downloader]; B <--> C([Web]); B --> D[(내 컴퓨터)]; D --> E[Data cleansing]; B --- F[python];
```

The diagram illustrates the data crawling process. It begins with a 'URL list' (represented by a cylinder) which feeds into a 'Downloader' (represented by a rectangle). The 'Downloader' interacts with the 'Web' (represented by an oval) via a double-headed arrow, indicating a bidirectional flow of data. The 'Downloader' also feeds into '내 컴퓨터' (My Computer, represented by a cylinder). Finally, the data from '내 컴퓨터' is sent to 'Data cleansing' (represented by a rectangle). A small icon of the Python logo is positioned below the 'Downloader' box.



## 2. Data Cleansing



1.mm-1



2.handtool



3.clip\_image002\_0002



4.maxresdefault



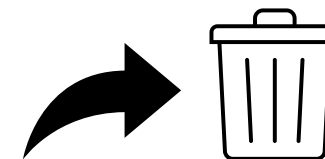
5.hqdefault



6.m18-claymore\_3



7.m18-claymore



8.d0b15b23403e59fda2985cd7f2ddfd5\_preview\_featured



9.m18-claymore\_2



10.claymore-678x381



11.51pmspxurl



12.340px-pmr-2a



13.0



14.m18-claymore\_7

Download를 통해 얻은  
초기 data set에서  
Garbage data 제거 및  
curated data 선별



15.720x720-20180819-222700



16.318075bc1e3a65f6fec2e31d3daf155



17.m18-claymore\_6



18.51olvvtf9bl



19.x7t4zhu



20.ae7a99282e5b70cb79b904028fc318a2



21.2f305bbd16f537e4237e3f6d9a1495e0\_1533186834



22.22d2ae01a6dccfe79ed2419b0458589e



23.isbl\_1680x420.41240494\_182hqk7q



24.nikon



25.dfafdcc0bfadf20de43bf2c855749f33



26.h04779c3c6de94a87a4382ff9ec5abe4e4

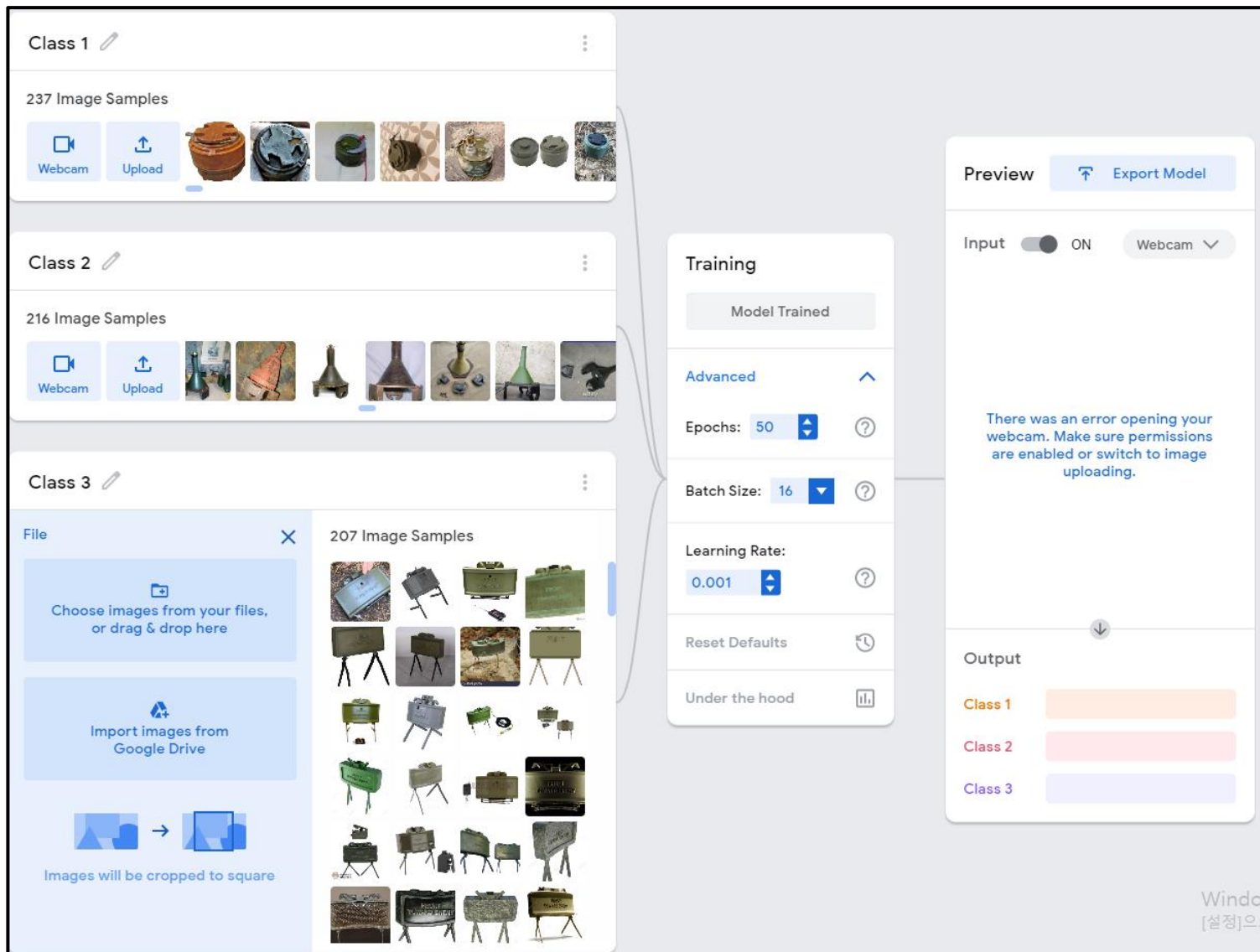


27.340px-livens\_gas\_projector\_loading



28.mm-1

### 3. Data training + Accuracy test



선별된 data로 지뢰 종류별  
class를 만들어 training을 진행

dataset 100개

Accuracy test

Validation set

Accuracy rate 70~80%

dataset 200개

Accuracy test

Validation set

Accuracy rate 90~95%



## 4. Fitting 된 알고리즘의 적용

What is this?

This link hosts a machine learning model created using [Teachable Machine](#), a tool that makes it easier for anyone – teachers, students, artists, makers of all kinds – to train machine learning models.

How does it work?

Machine learning models are trained on examples (e.g., images, sounds, poses) gathered by the creator. Their results depend on the data they've been trained on.

Want to use this model in your project?

See [this link](#) to learn how to use Teachable Machine models in your projects.

Report this model:

If you have concerns about this model, email us at [teachablemachine-support@google.com](mailto:teachablemachine-support@google.com).

This model:

[teachablemachine.withgoogle.com/models/o\\_5y3DgJZ/](https://teachablemachine.withgoogle.com/models/o_5y3DgJZ/)

[/model.json](#)

The model architecture, used by tensorflow.js library

[/metadata.json](#)

Contains the model metadata, for example class labels and version of library

[/model.weights.bin](#)

Tensorflow.js binary file containing the model weights

Preview this model live

Choose images from your files,  
or drag & drop here

Import images  
from Google Drive



Output

Haftho...

M2  
SLAM

M14  
mine

M15  
mine

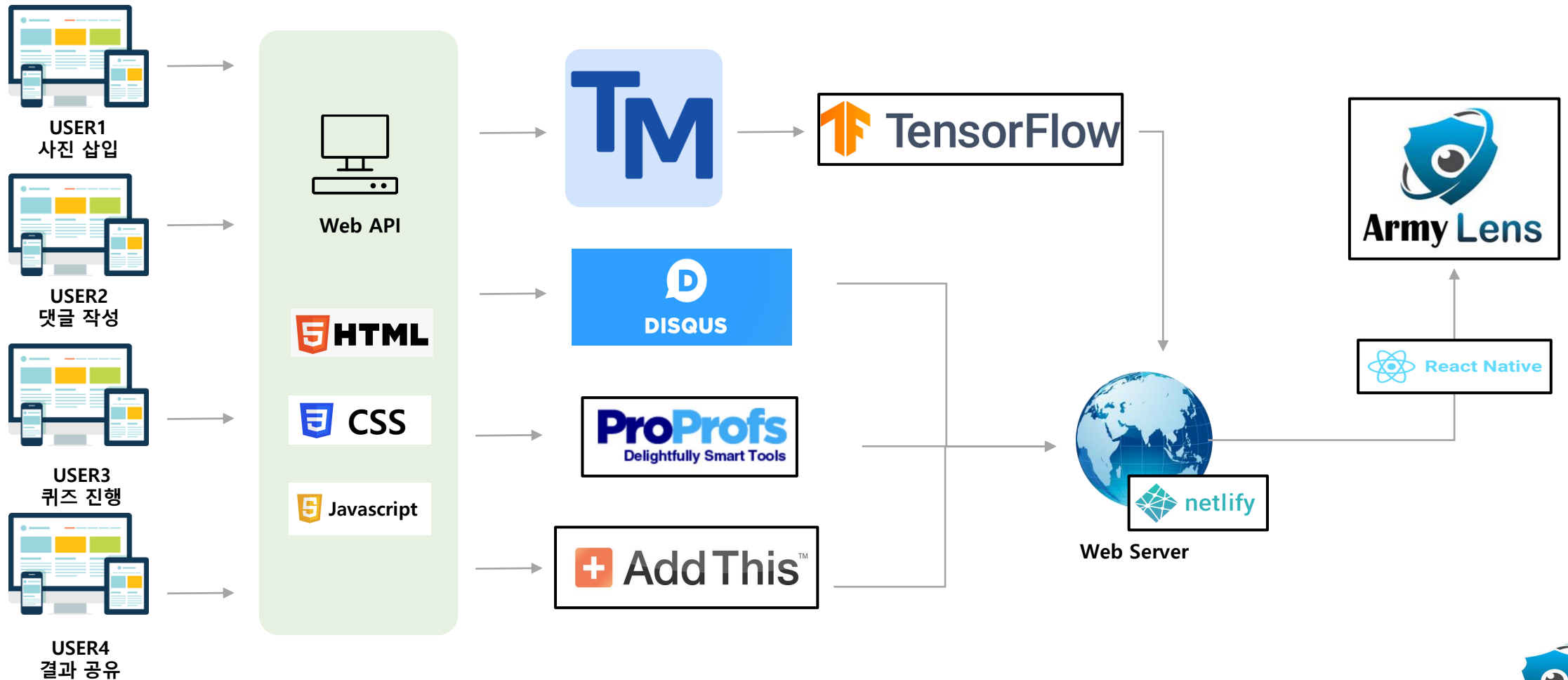
M16  
mine

M18A1

MM-1

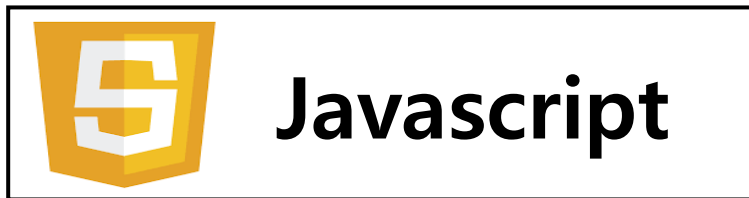
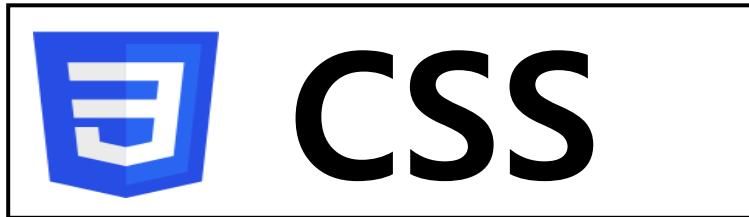
최종적으로 fitting된  
알고리즘을 추출하여  
Webpage에 적용

# Data Architecture

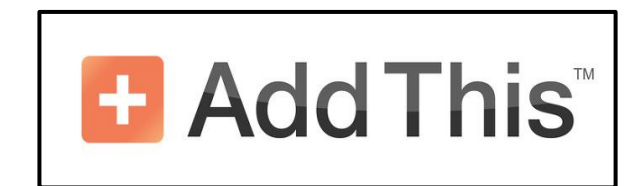


# 기술 스택

## Frontend



## Server(back-end)





## 기대 효과

무지로 인한 민간인의 유실 지뢰 **피해 감소**

지뢰 식별, 신고를 one-stop service로 제공하여 **소요 시간 단축 및 비용 감소**

현재 우리나라에서 일어나는 지뢰 관련 사고를 접하여 **경각심 증가**

관련 정보를 공부하고, 퀴즈를 통해 학습정도를 확인하여 **교육 활용 가능성**







## 발전 가능성

- 국방부의 data를 활용한다면 **정확도 높은 머신 러닝 학습** 가능
- 안보위협요소들을 통합하여 머신 러닝 학습을 진행하여 훈련, 경계근무 등의 상황에서 **임무수행 보조 어플**로 활용 가능