

오픈소스 공간정보 미디어 서비스 플랫폼 기술

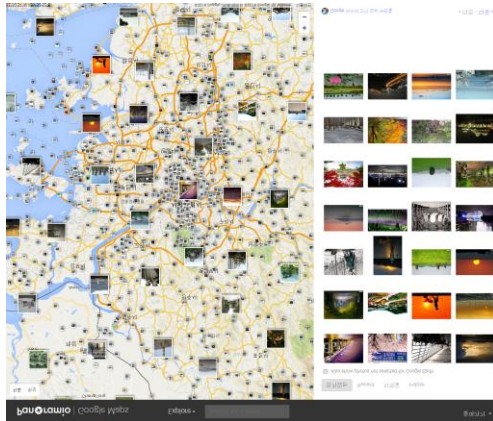
군산대학교 컴퓨터정보통신공학부 컴퓨터정보공학전공

남 광 우

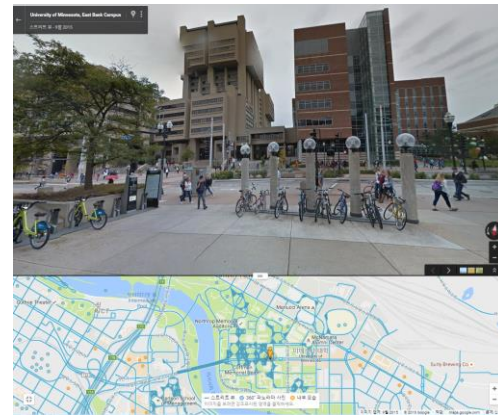
kwnam@kunsan.ac.kr

공간정보 미디어

- 일반적인 공간좌표 및 POI 등의 공간 정보와 웹 문서, 도서, 사진, 동영상, 음성 등의 미디어가 결합된 공간정보 콘텐츠들의 등장
 - 예) GoPro, PointCloud, 차량 블랙박스, 360 파노라마, 구글 글래스



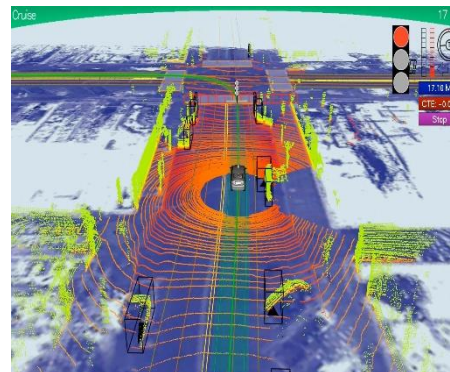
GeoTagged Photo(Panoramio)



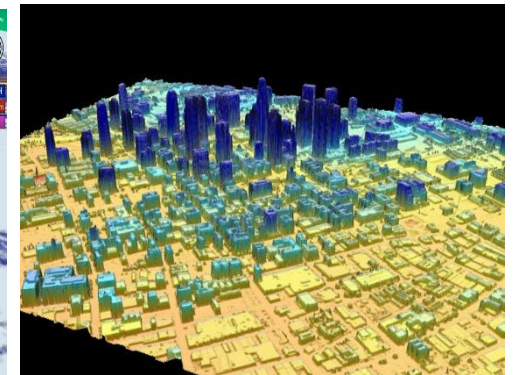
360 Panorama(StreetView)



Car Blackbox Video



자율주행차 PointCloud(LiDAR)

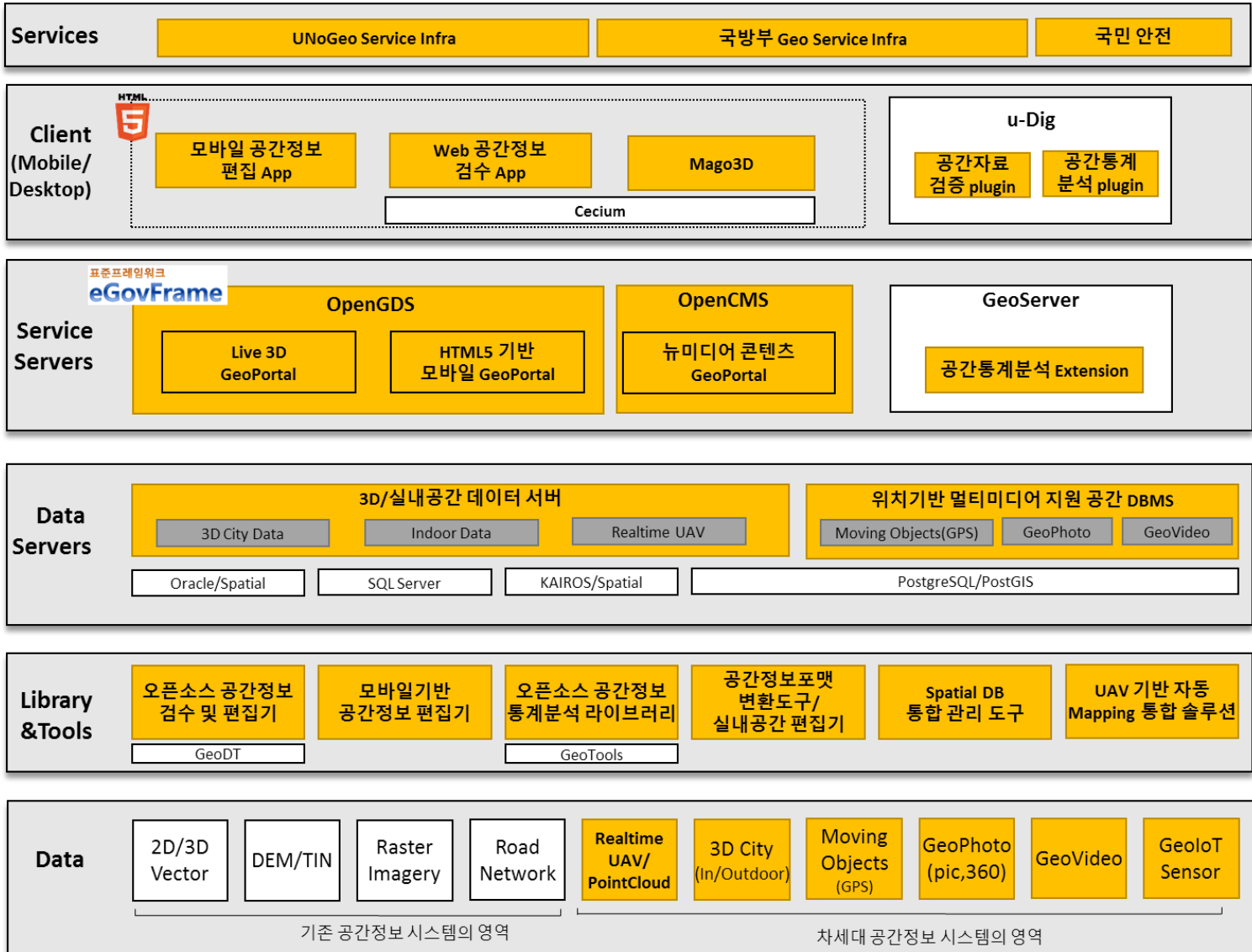


공간정보 미디어의 진화

- 공간정보 서비스 패러다임의 변화

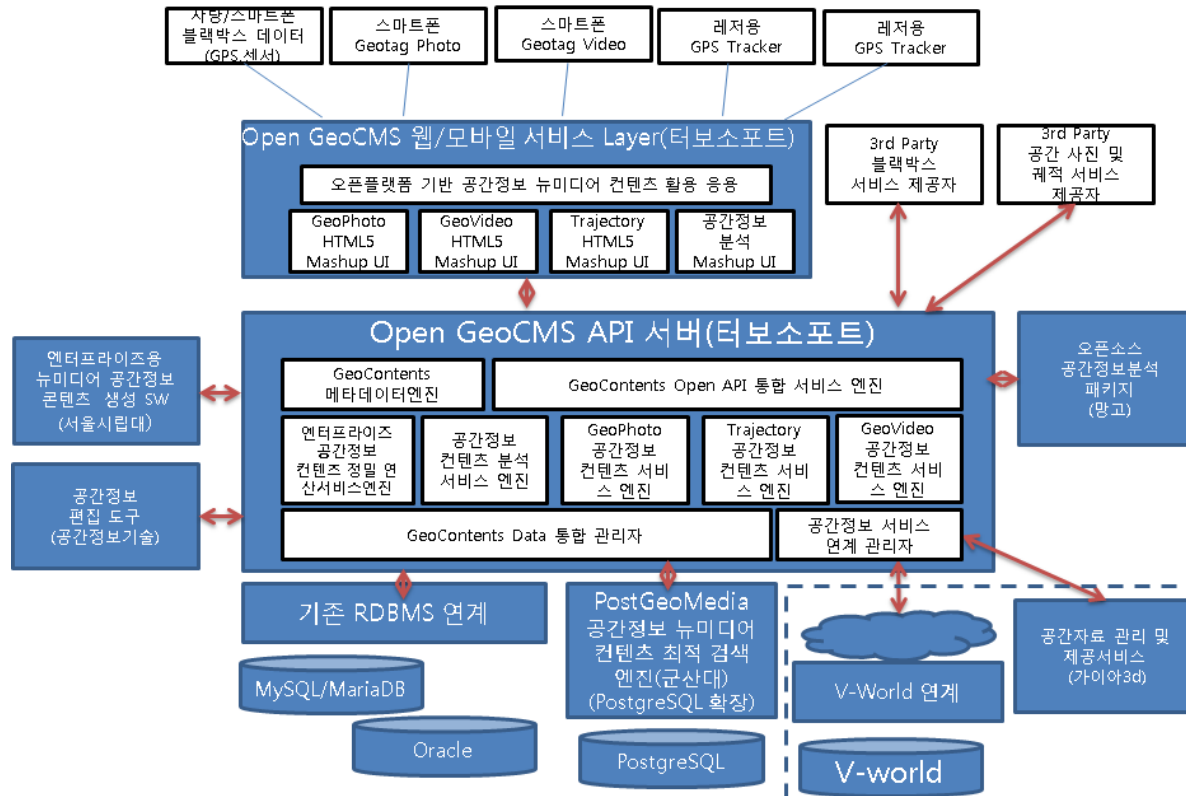


공간정보 서비스의 개발 플랫폼



GeoCMS Architecture

- Geomedia on PostgreSQL/PostGIS
GeoCMS에서의 콘텐츠 저장 분석 기술 도구



*GeoPhoto/GeoVideo : Geotag을 포함한 일반 및 파노라마 사진 및 비디오

GeoMedia : GeoPhoto

Geophoto \supset GPSPhoto

GPSPhoto

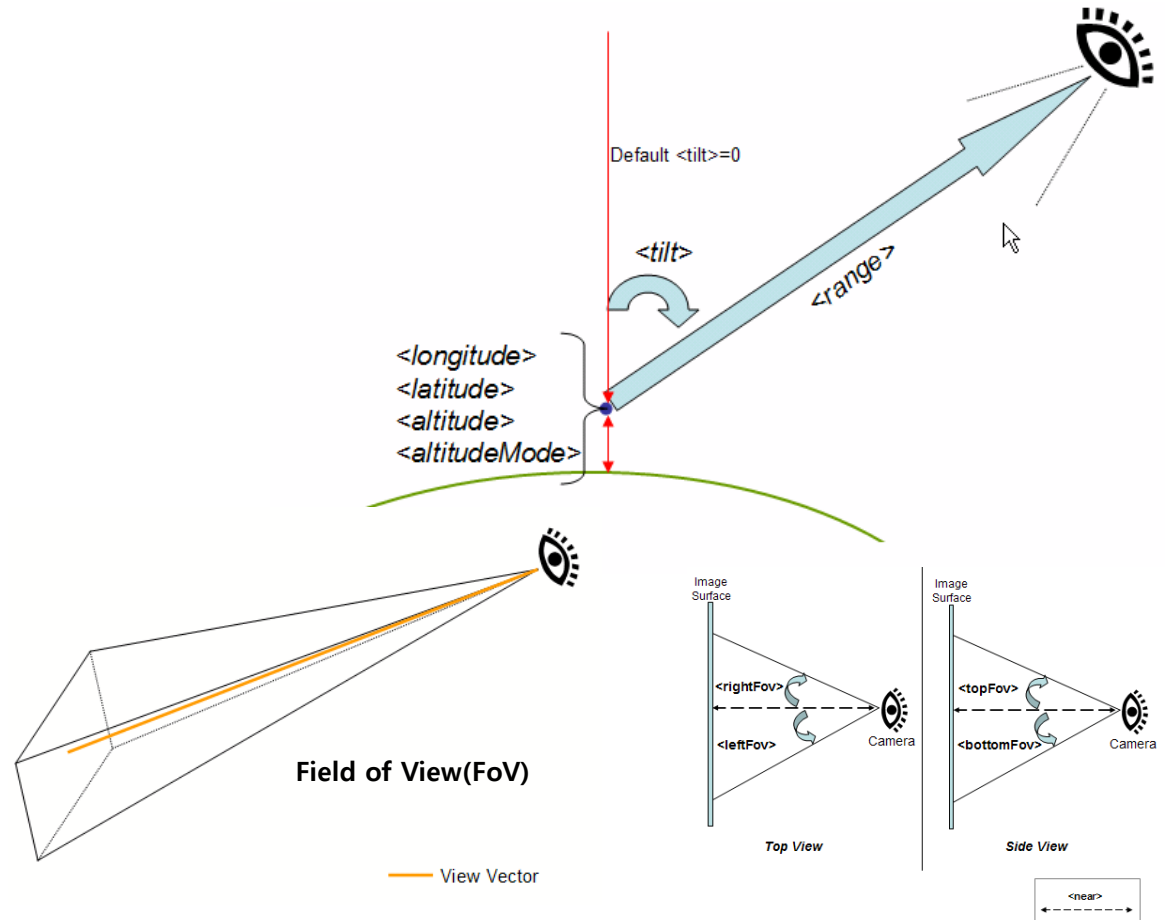
GPS Tagged Photo

(x, y, z)



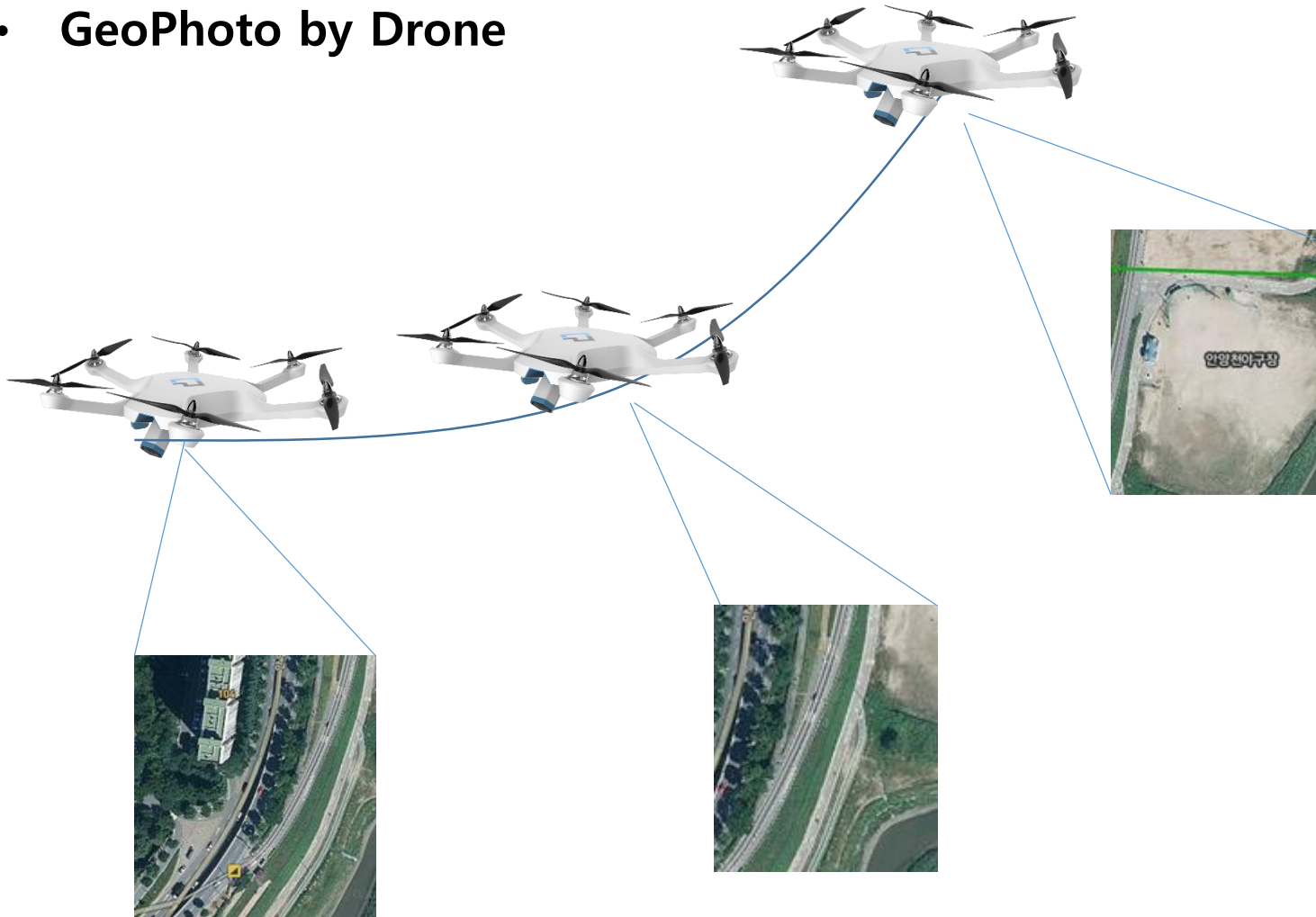
Geophoto

KML Camera, Lookat + Field of View



SpatialMedia : GeoPhoto

- **GeoPhoto by Drone**



SpatialMedia : GeoPhoto

- **Camera in KML**

```
<Camera id="ID">
  <longitude>0</longitude>      <!-- kml:angle180 -->
  <latitude>0</latitude>        <!-- kml:angle90 -->
  <altitude>0</altitude>        <!-- double -->
  <heading>0</heading>          <!-- kml:angle360 -->
  <tilt>0</tilt>                <!-- kml:anglepos180 -->
  <roll>0</roll>                <!-- kml:angle180 -->
  <altitudeMode>clampToGround</altitudeMode>
    <!-- kml:altitudeModeEnum: relativeToGround, clampToGround, or absolute -->
    <!-- or, gx:altitudeMode can be substituted: clampToSeaFloor, relativeToSeaFloor -->
</Camera>
```


PostGeoMedia

GPS Trajectory and Moving Sensor Data

```
CREATE TABLE car (  
  id      INTEGER,  
  number  VARCHAR,  
  model   VARCHAR,  
  driver  VARCHAR,  
  traj    MOVINGPOINT,  
  accel   MOVINGFLOAT  
);  
CREATE INDEX trajidx ON car USING gist( traj );
```

```
SELECT id, driver, projection(traj, 'SPATIAL'), projection(traj, 'TEMPORAL')  
FROM   car  
WHERE  pass( traj, box2d(10, 10, 100, 100) );
```

```
SELECT id, driver  
FROM   car  
WHERE  stayin( traj, box2d(10, 10, 100, 100), 'over' , '1 hour' );
```

PostGeoMedia

GeoPhoto : Drone Contents with GPS Trajectory

```
CREATE TABLE droneFlights (  
  id                INTEGER,  
  flightbegin       TIMESTAMP,  
  flightend         TIMESTAMP,  
  flightRegion      geometry,  
  photoRegion       geometry,  
  comment           VARCHAR,  
  mphoto            MOVINGPHOTO  
);
```

```
CREATE TYPE movingphoto (  
  pid                INTEGER,  
  traj               MOVINGPOINT,  
  sensor             MOVINGFLOAT,  
  gphoto             GEOPHOTOS  
);
```

```
SELECT id, comment, projection(mphoto.traj, 'SPATIAL'), projection(mphoto.traj, 'TEMPORAL')  
FROM droneflights  
WHERE pass( mphoto, box2d(10, 10, 100, 100) );
```

```
SELECT id, comment  
FROM droneflights  
WHERE stayin( mphoto, box2d(10, 10, 100, 100), 'over' , '1 hour' );
```

GeoMedia : Moving Objects

- **GPS Trajectory and GeoVideo : Blackbox**

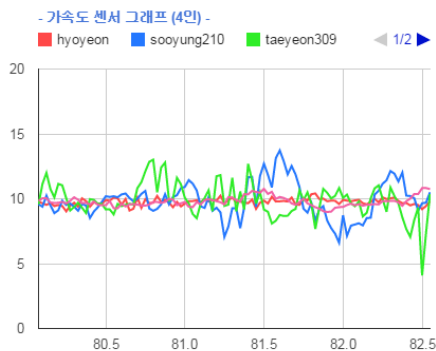
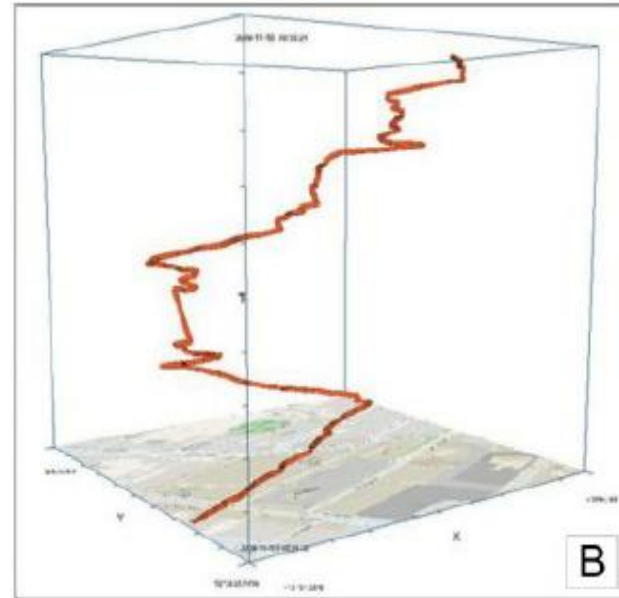
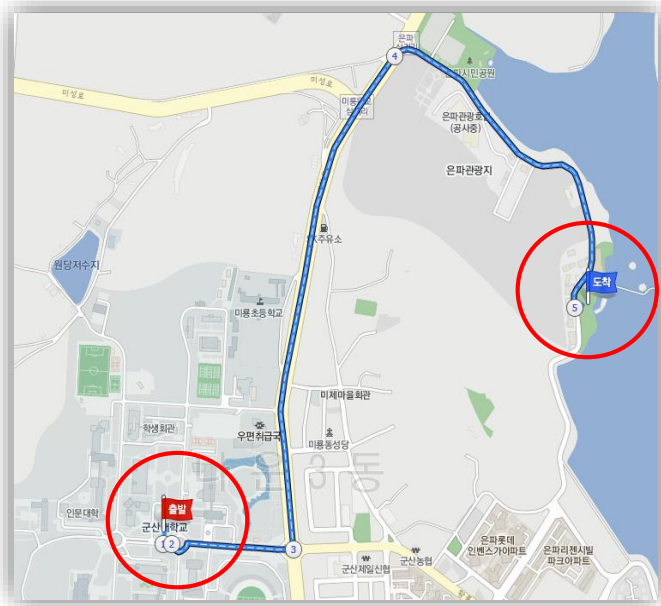


이름	수정된 날짜	유형	크기
20140518_132518_N.3gf	2014-05-18 오후...	3GF 파일	4KB
20140518_132518_N.gps	2014-05-18 오후...	Gomplayer Skin F...	23KB
20140518_132518_N.mp4	2014-05-18 오후...	GOM 미디어 파일...	26,523KB
20140518_132556_E.3gf	2014-05-18 오후...	3GF 파일	6KB
20140518_132556_E.gps	2014-05-18 오후...	Gomplayer Skin F...	29KB
20140518_132556_E.mp4	2014-05-18 오후...	GOM 미디어 파일...	36,863KB
20140518_132657_N.3gf	2014-05-18 오후...	3GF 파일	6KB
20140518_132657_N.gps	2014-05-18 오후...	Gomplayer Skin F...	31KB
20140518_132657_N.mp4	2014-05-18 오후...	GOM 미디어 파일...	36,266KB
20140518_132758_N.3gf	2014-05-18 오후...	3GF 파일	6KB
20140518_132758_N.gps	2014-05-18 오후...	Gomplayer Skin F...	31KB
20140518_132758_N.mp4	2014-05-18 오후...	GOM 미디어 파일...	36,231KB
20140518_132858_N.3gf	2014-05-18 오후...	3GF 파일	6KB
20140518_132858_N.gps	2014-05-18 오후...	Gomplayer Skin F...	31KB
20140518_132858_N.mp4	2014-05-18 오후...	GOM 미디어 파일...	36,248KB
20140518_132958_N.3gf	2014-05-18 오후...	3GF 파일	6KB
20140518_132958_N.gps	2014-05-18 오후...	Gomplayer Skin F...	31KB
20140518_132958_N.mp4	2014-05-18 오후...	GOM 미디어 파일...	36,253KB
20140518_133058_N.3gf	2014-05-18 오후...	3GF 파일	6KB

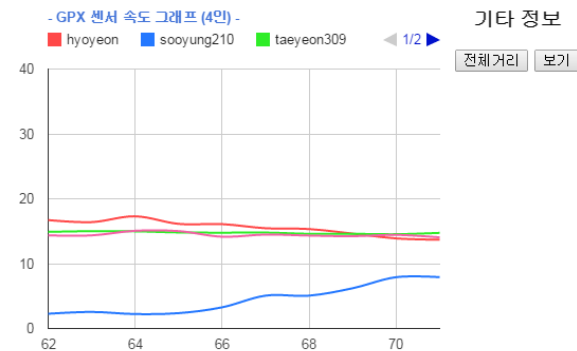
- *.mp4 : video data
- *.gps : gps data(NMEA)
- *.3gf : acceleration sensor

GeoMedia : Moving Objects

- GPS Trajectory and GeoVideo의 분석과 모니터링



차량 3대
센서 데이터
비교 분석



PostGeoMedia

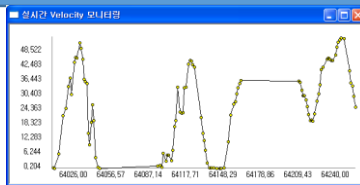
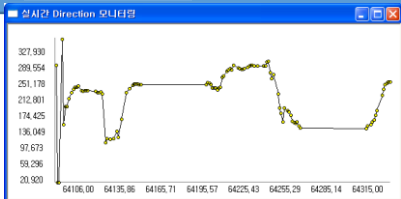
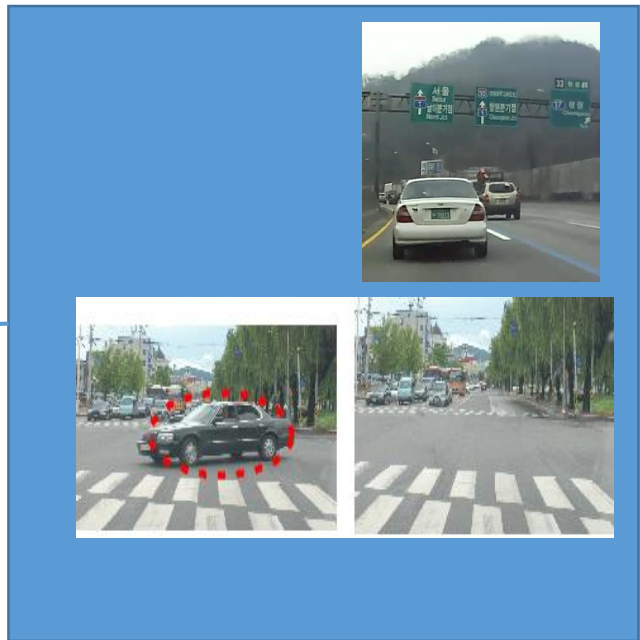
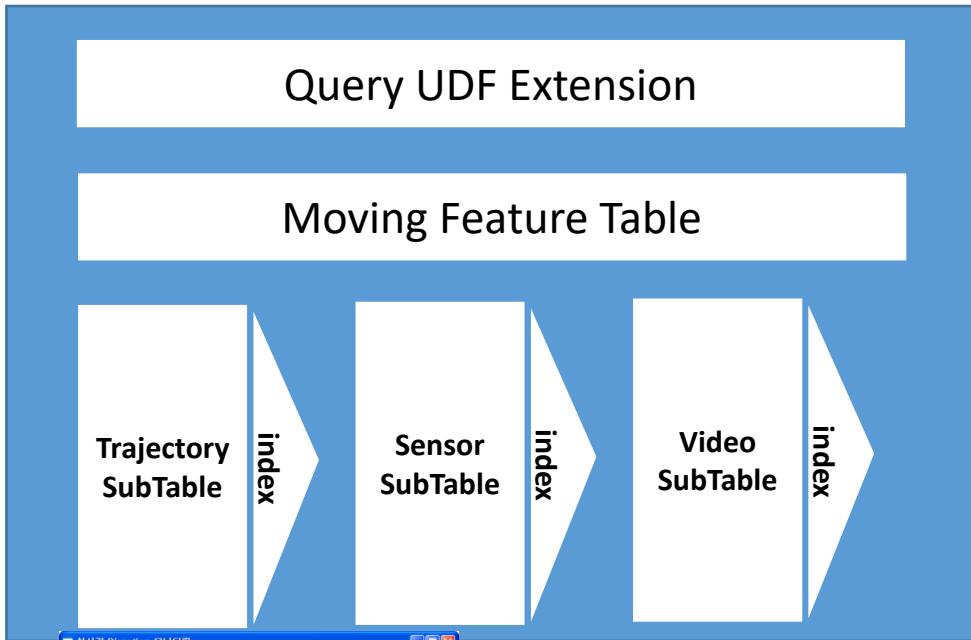
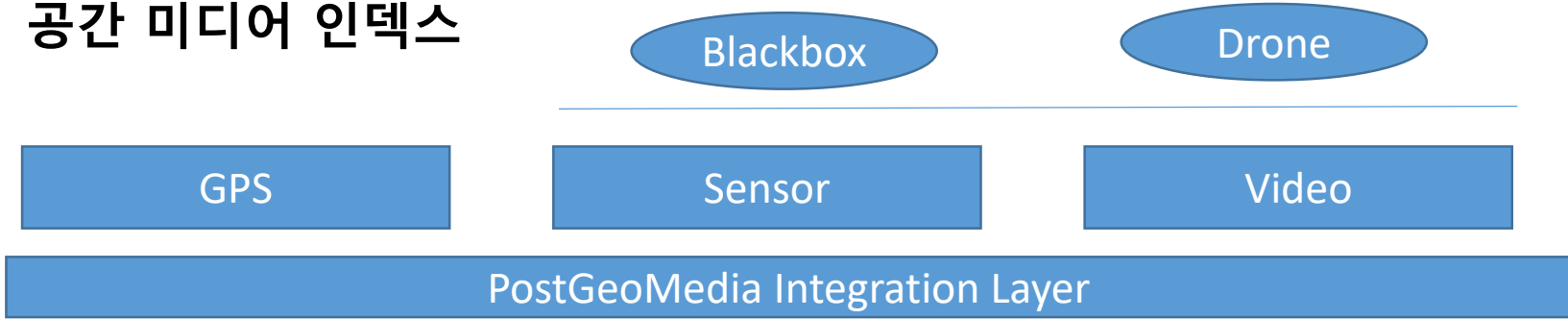
PostGeoVideo

```
CREATE TABLE drone (  
  id      INTEGER,  
  number  VARCHAR,  
  model   VARCHAR,  
  driver  VARCHAR,  
  traj    MOVINGPOINT,  
  sensor1 MOVINGFLOAT,  
  sensor2 MOVINGFLOAT,  
  gvideo  GEOVIDEO  
);
```

```
CREATE INDEX trajidx ON drone USING gist( traj );  
CREATE INDEX gvideoidx ON drone USING gist( gvideo );
```

PostGeomeedia

- 공간 미디어 인덱스



Storage :

- Traditional Table
- Plain Binary Objects
- Compressed WKB

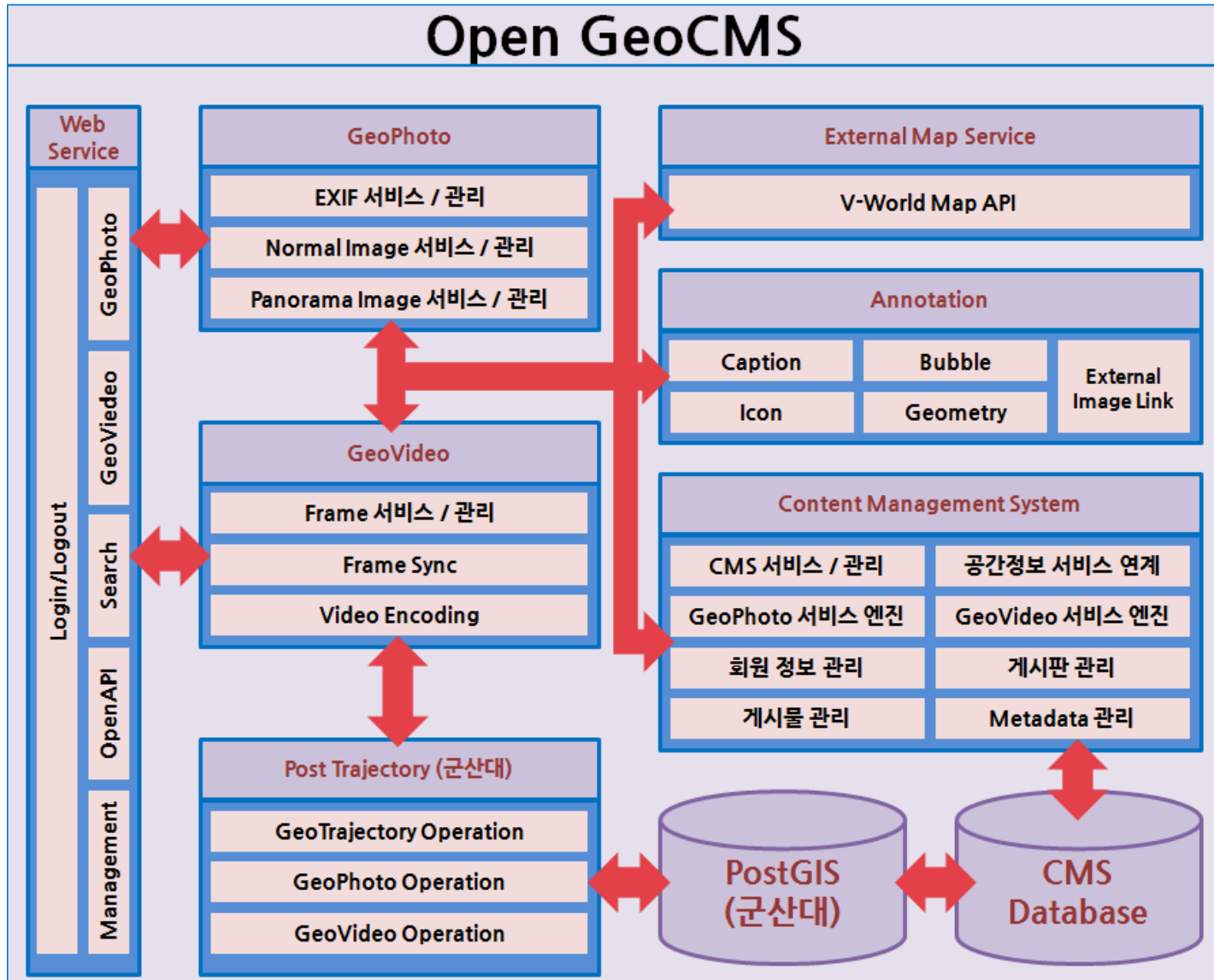
Indexes :

- 3DR Tree on GiST
- SETI* on ORDB
- Bx* Tree on GiST

Materialized

View

Open GeoCMS



GeoCMS : 미디어 생성

- **GeoPhoto**
 - Photo Markup 정보 생성
 - 웹 기반 GeoPhoto 생성기

Shape Style : Circle Rect Point

Line Color : #959595 MouseOver Color : ■

확인

ID	Type	Data
g2	Geometry	Point
b0	Bubble	불법현수막
g3	Geometry	Point
b1	Bubble	불법간판

Image Information

EXIF
EXIF-GPS

Map

영역설정Part



GeoCMS : 미디어 생성

- **GeoVideo**
 - GeoVideo 시공간 Markup 생성
 - GeoReferenced Video 구축(mp4)

The screenshot displays the GeoCMS interface with several key components:

- Top Bar:** Navigation buttons for 'Caption', 'Speech Bubble', 'Image', and 'Geometry'.
- Video Preview:** A central window showing a street scene with a white van and buildings.
- Timeline:** A horizontal axis with time markers from 00:00:00 to 01:40:00. Below it is a track for 'IDfram' and 'Type' with a list of frame data.
- Properties Panel:** A table on the right side of the interface.

ID	Name	X1	X2

ID	Type	Data
c0	Caption	test
b0	Bubble	t e s t
i0	Image	images/icon/black/d4.png
i1	Image	images/icon/black/d14.png

At the bottom right, a Google Maps view shows the video's georeferenced location in a city street, with a red line indicating the video's path.



GeoVideo.mp4

GeoCMS : GeoMedia Portal

- **GeoMedia Portal**

- GeoPhoto, GeoVideo를 통해 생성된 공간정보 콘텐츠 관리
- Geo-referencing 데이터 검색 제공
- EASY 매쉬업 지원을 위한 OpenAPI 연계 기능 제공

The screenshot displays the GeoCMS GeoMedia Portal interface. At the top, there is a navigation bar with the GeoCMS logo, a search bar, and links for 'Make Contents' and 'Open API'. The left sidebar contains a 'Content Board' with a grid of image thumbnails, each with associated user and date information. Below the board is a 'Latest Uploads' section. The main area is a Google Map of South Korea with several red location pins. The footer includes the KRIHS and GeoCMS logos and contact information.

GeoCMS : 아동 안전지도



Geo CMS Geo Community Management System

Search [] Make Contents Open API

Legend EDIT turbo

<신고 의관 교통 현황 정보 공유>

Writer: testUser Date: 2016-01-12	Writer: testUser Date: 2016-01-12	Writer: testUser Date: 2016-01-08
Writer: testUser Date: 2016-01-08	Writer: turbo Date: 2016-01-07	
Writer: user1 Date: 2016-01-06	Writer: user1 Date: 2016-01-06	Writer: user1 Date: 2016-01-06
Writer: user1 Date: 2016-01-06	Writer: user1 Date: 2016-01-05	Writer: user1 Date: 2016-01-05

Latest Uploads

	Writer: testUser Date: 2016-01-12
--	--------------------------------------

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신진초등학교 아동안전지도

- 시각장애** : 시각장애 눈에 띄지 않아 위험 상황에 도통할 수 없으므로, 아동안전지도를 위험해자가 도움이 될 수 있도록 해 안전하게 도통할 수 있게요.
- 교통량** : 교통량이 많고 사람이 많이 다니지 않아서 위험해요.
- 주거시설** : 공사장 주변 위험한 곳을 표시해서 보여요.
- 기타시설** : 기타 시설이 있어 보여 나타내 보여요.
- 시각장애** : 시각장애 눈에 띄지 않아 위험 상황에 도통할 수 없으므로, 아동안전지도를 위험해자가 도움이 될 수 있도록 해 안전하게 도통할 수 있게요.
- 교통량** : 교통량이 많고 사람이 많이 다니지 않아서 위험해요.
- 주거시설** : 공사장 주변 위험한 곳을 표시해서 보여요.
- 기타시설** : 기타 시설이 있어 보여 나타내 보여요.
- CCTV** : CCTV가 지켜보고 있어 범죄를 일으키기 어려워요.

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GeoCMS : 전염병 관제

- 조류 독감

The screenshot displays the GeoCMS web interface for bird flu management. The main area features a Google Map of Gyeongju, South Korea, with several red location pins. Each pin is accompanied by a thumbnail image of a bird's internal organs, likely showing signs of infection. The interface includes a search bar at the top, navigation tabs for '신고', '의견', '교통', '현장', '정보', and '아류', and a 'Content Board' sidebar on the left. The sidebar contains a grid of image thumbnails, each with a 'Writer' and 'Date' label. At the bottom, there is a 'Latest Uploads' section and a footer with contact information for KRIHS and GeoCMS.

Geo CMS
Geo Contents Management System

Logout EDIT turbo

Make Contents Open API

신고 의견 교통 현장 정보 아류

Content Board

Writer : testUser Date : 2016-01-12
Writer : testUser Date : 2016-01-12
Writer : testUser Date : 2016-01-08
Writer : turbo Date : 2016-01-07
Writer : user1 Date : 2016-01-06
Writer : user1 Date : 2016-01-06
Writer : user1 Date : 2016-01-06
Writer : user1 Date : 2016-01-06
Writer : user1 Date : 2016-01-05
Writer : user1 Date : 2016-01-05

Latest Uploads

Writer : testUser Date : 2016-01-12

KRIHS Geo CMS

지도 데이터 ©2016 SK planet. 이용권
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Another Geo Media ?

