

# *Opportunities: Beyond Geographic Space*



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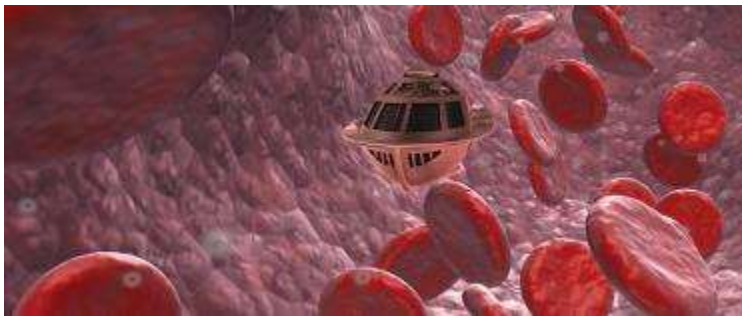
# Opportunities: Beyond Geographic Space

- Spaces other than Earth
  - Challenge: reference frame?
- Ex. Human body
  - What is Reference frame ?
    - Adjust to changes in body
    - For MRIs, X-rays, etc.
  - What map projections?
  - Define path costs and routes to reach a brain tumor ?

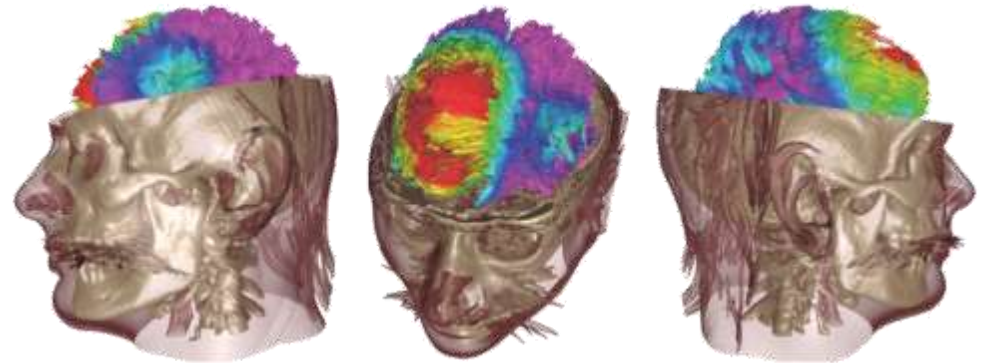
<b>Outer Space</b>	<b>Moon, Mars, Venus, Sun, Exoplanets, Stars, Galaxies</b>
<b>Geographic</b>	<b>Terrain, Transportation, Ocean, Mining</b>
<b>Indoors</b>	<b>Inside Buildings, Malls, Airports, Stadiums, Hospitals</b>
<b>Human Body</b>	<b>Arteries/Veins, Brain, Neuromapping, Genome Mapping</b>
<b>Micro / Nano</b>	<b>Silicon Wafers, Materials Science</b>

Shashi Shekhar, 2015

McKnight Distinguished University Professor Department of Computer Science and Engineering, University of Minnesota, [www.cs.umn.edu/~shekhar](http://www.cs.umn.edu/~shekhar)



<http://convergence.ucsb.edu/issue/14>



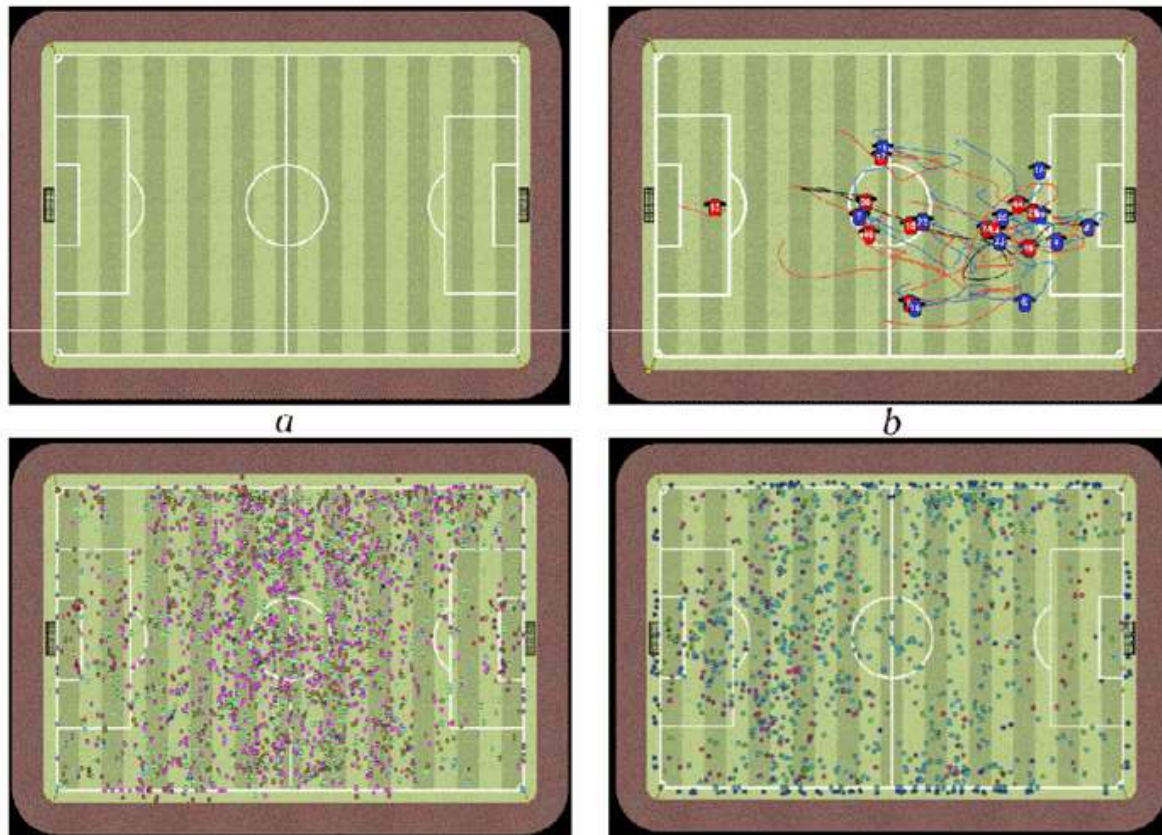
The spaces where interdisciplinary and transdisciplinary challenges arise are primarily those of human experience, involving mostly geographic and smaller (but still perceivable) spaces. Using a slightly modified version of Montello's classification (Montello 1993), these include:

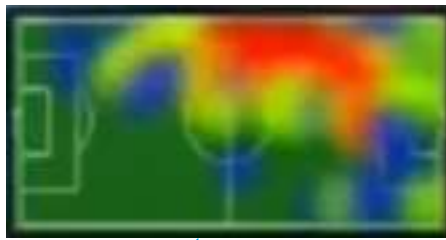
- *geographic* spaces (such as a neighbourhood in a city or a river catchment);
- *indoor* spaces (such as a room or a hallway);
- *body* spaces (such as a human body or organ);
- *tabletop* spaces (such as a desktop or workbench); and
- *images* of anything.

# How GIS Can Help With Football Game Analysis

FEBRUARY 15, 2017 BY [MARKALTAWEEL](#)

Football (or Soccer) is a game of tactics and knowing **how to move players at the right place and time**. This makes the game a **spatial strategy game** that GIS has practical applications in addressing. The use of [GPS technologies](#) has been applied in training, where optimized locations for player placement, among other uses, are determined by tracking. Such data can be used in cluster or proximity analyses that look at how often and how close players are to each other in the course of given plays. Other ways to analyze effectiveness of players is to monitor morphological changes in defensive players' positioning relative to a person with the ball. Those who cause the most number of players to change their position when they have the ball are considered to be the most influential or relatively effective in that they cause more reaction.





Sepak Bola menggunakan analisis SIG yaitu *Hotspot analysis*

Barcelona vs Villarreal 4-1 - All Goals & Extended Highlights - La Liga 06/05/2017 HD

GOLAZO TV

315,361 views

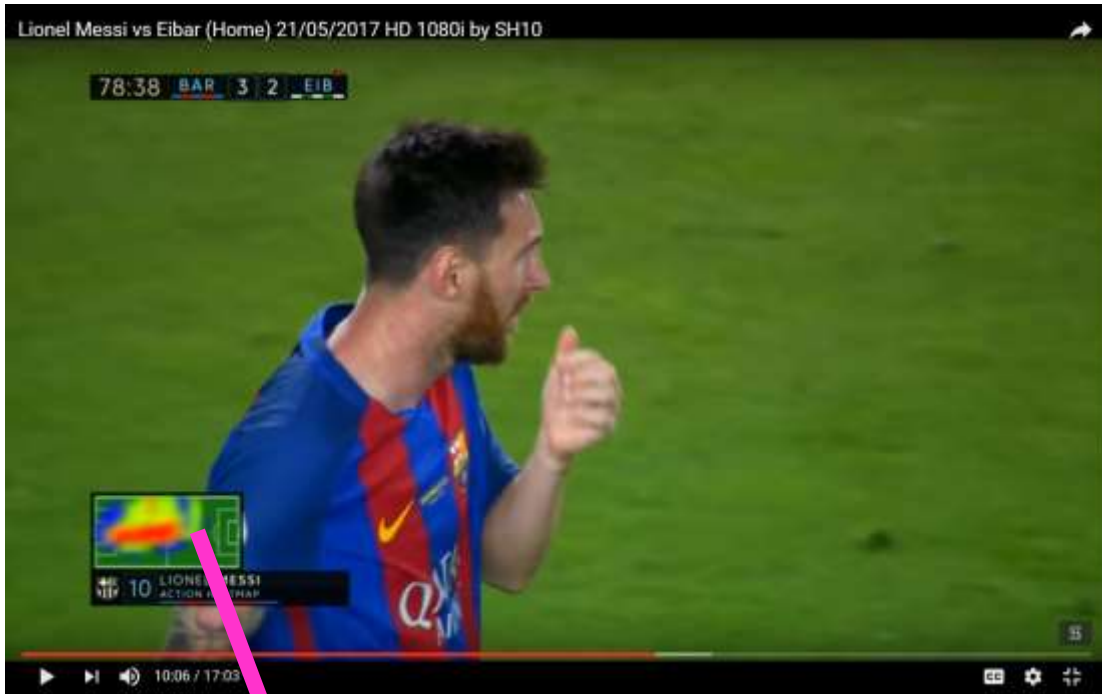
Published on May 6, 2017

Barcelona vs Villarreal 4-1 - All Goals & Extended Highlights - La Liga 06/05/2017 HD  
Goals: Neymar 21', Cedric Bakambu 32', Lionel Messi 45' 82' penalty, Luis Suarez 69'

<https://www.youtube.com/watch?v=uC2gNhSAX2g>

Published on May 6, 2017

Barcelona vs Villarreal 4-1 - All Goals & Extended Highlights - La Liga 06/05/2017 HD  
Goals: Neymar 21', Cedric Bakambu 32', Lionel Messi 45' 82' penalty, Luis Suarez 69'



<https://www.youtube.com/watch?v=Elcni9njbbo>



# Using GIS to Choreograph Dance

JUNE 25, 2016 BY [MARK ALTAWHEEL](#) [SPATIAL ANALYSIS](#)

<https://www.gislounge.com/using-gis-choreograph-dance/>



ARCGIS SPATIAL ANALYST WAS USED TO GENERATE A [DENSITY SURFACE](#) FROM POINT DATA CREATED BY A SINGLE DANCER'S MOVEMENTS. SOURCE: *GIS TO UNDERSTAND DANCE, AND VICE VERSA*, 2009.

# Sistem Informasi Geografis (SIG)

Sistem Informasi Geografis (SIG) secara efektif digunakan untuk mengidentifikasi karakteristik, pola, dan pergerakan pemain.

Lebih dari itu, SIG secara aktif digunakan juga dalam bisnis olahraga yang melibatkan pemilihan lokasi stadion untuk mengelola keamanan di acara olahraga.

Tidak terbatas pada satu olahraga, SIG secara aktif digunakan di sepak bola (*football*), sepak bola (*soccer*), rugby, renang dan olahraga lainnya untuk analisis kinerja atlet yang akurat.

Contoh:

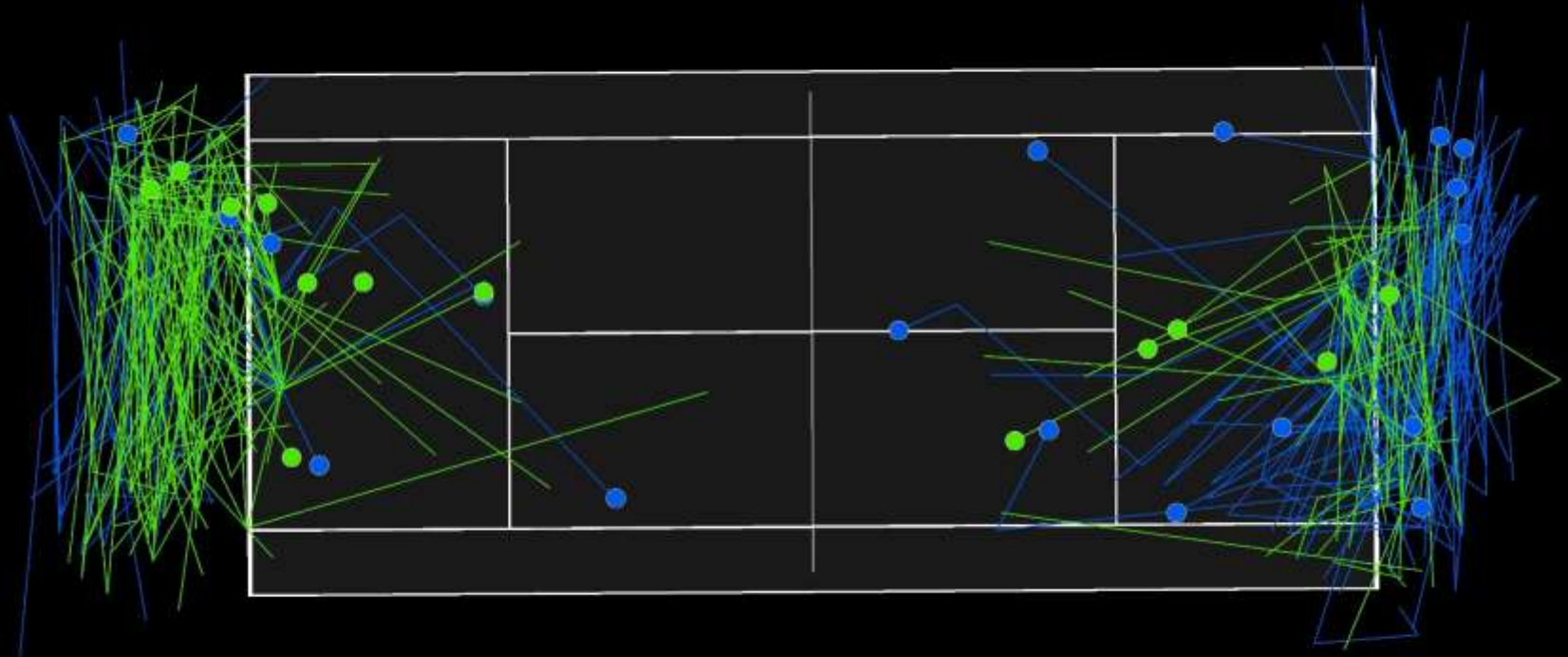
Damien Damej, seorang Cartographer, menggunakan ArcGIS 10.1 dari Esri untuk mengidentifikasi pola pertandingan tenis perebutan Medali Emas Olimpiade London 2012 antara Roger Federer dan Andy Murray. Perangkat lunak SIG digunakan untuk menggambar posisi pukulan yang memenangkan dan pola pergerakan setiap pemain (<https://blogs.esri.com/esri/arcgis/2012/09/05/using-arcgis-for-sports-analytics/>)



# Federer v Murray

Player movement and winning shot position

Gold Medal Match, London Olympics



Federer

● Winning shot position  
— Movement

Murray

● Winning shot position  
— Movement



Design: @damiendamej

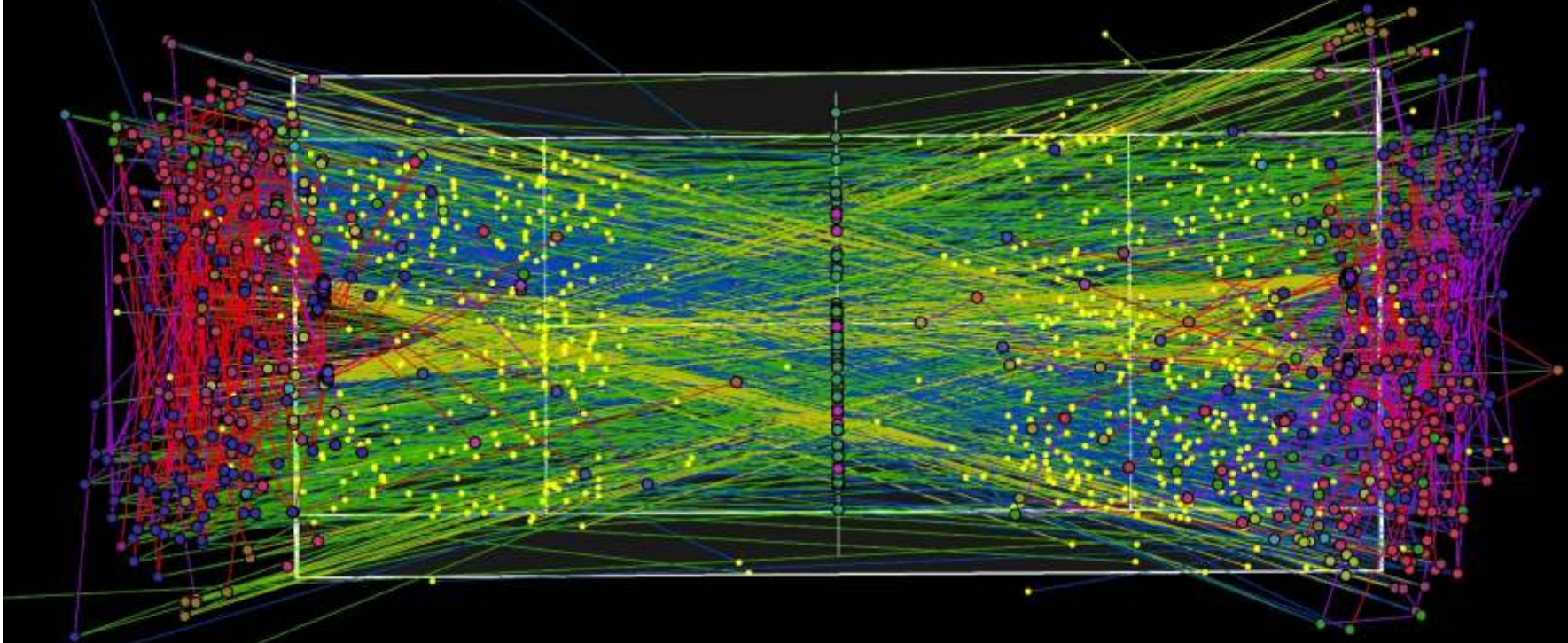
Pola pergerakan pemain dan posisi pukulan yang memenangkan pertandingan dalam Pertandingan perebutan Medali Emas Olimpiade London 2012 antara Roger Federer dan Andy Murray (Hak Cipta: Damien Damej)

<https://blogs.esri.com/esri/arcgis/2012/09/05/using-arcgis-for-sports-analytics/>

# Federer v Murray

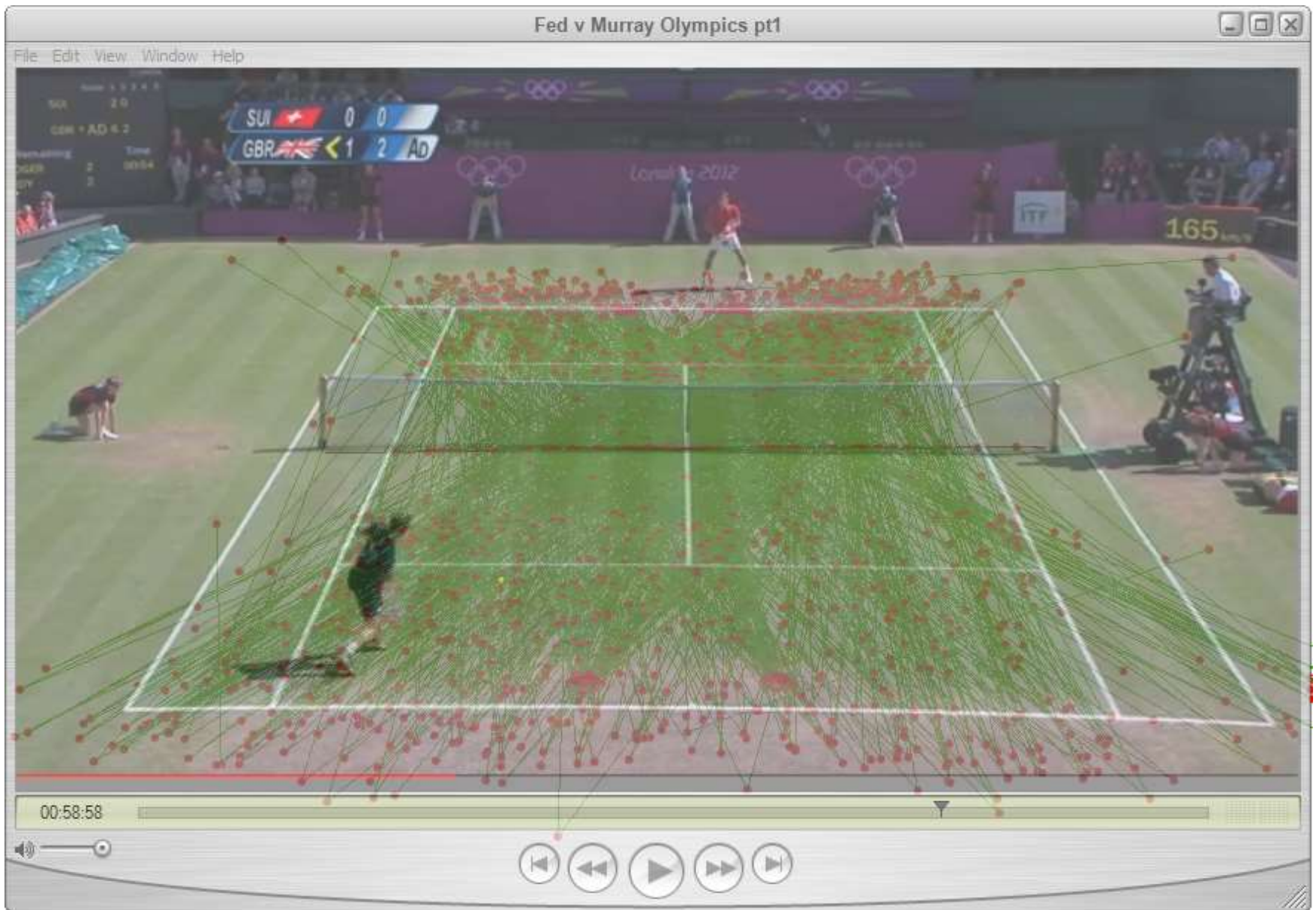
Data dump

Gold Medal Match, London Olympics



Design: @damiendemaj

Kumpulan data lengkap dari Pertandingan perebutan Medali Emas Olimpiade London 2012 antara Roger Federer dan Andy Murray. Lokasi 1708 titik dikumpulkan dari 3 set pertandingan.



Rekaman video pertandingan di ArcScene. Titik merah mewakili posisi memukul bola (stroke) dan bola memantul. Garis hijau mewakili arah perjalanan bola untuk setiap tembakan.

Table

TennisMatchData

OBJECTID*	Shape *	Stroke	Player	Server	PointScore	GameScore	SetNum	Shot_Result	ShotNumINTRev1	PointNumRev9
1	Point Z	First Serve	Andy Murray	Andy Murray	0000	00	1	<Null>	1	1
2	Point Z	First Serve Bounce	Andy Murray	Andy Murray	0000	00	1	<Null>	2	1
3	Point Z	Backhand Return First Serve	Roger Federer	Andy Murray	0000	00	1	<Null>	3	1
4	Point Z	Backhand Bounce	Roger Federer	Andy Murray	0000	00	1	<Null>	4	1
5	Point Z	Backhand	Andy Murray	Andy Murray	0000	00	1	<Null>	5	1
6	Point Z	Backhand Bounce	Andy Murray	Andy Murray	0000	00	1	<Null>	6	1
7	Point Z	Forehand	Roger Federer	Andy Murray	0000	00	1	<Null>	7	1
8	Point Z	Forehand Bounce	Roger Federer	Andy Murray	0000	00	1	<Null>	8	1
9	Point Z	Forehand	Andy Murray	Andy Murray	0000	00	1	<Null>	9	1
10	Point Z	Forehand Bounce	Andy Murray	Andy Murray	0000	00	1	<Null>	10	1
11	Point Z	Forehand	Roger Federer	Andy Murray	0000	00	1	<Null>	11	1
12	Point Z	Forehand Bounce	Roger Federer	Andy Murray	0000	00	1	<Null>	12	1
13	Point Z	Backhand	Andy Murray	Andy Murray	0000	00	1	<Null>	13	1
14	Point Z	Backhand Volley	Roger Federer	Andy Murray	0000	00	1	<Null>	14	1
15	Point Z	Backhand Volley Bounce	Roger Federer	Andy Murray	0000	00	1	<Null>	15	1
16	Point Z	Forehand	Andy Murray	Andy Murray	0000	00	1	Forced Error	16	1
17	Point Z	Forehand Bounce	Andy Murray	Andy Murray	0000	00	1	Out	17	1
18	Point Z	First Serve Into Net	Andy Murray	Andy Murray	1515	00	1	Into Net	2	3
19	Point Z	Second Serve	Andy Murray	Andy Murray	1515	00	1	<Null>	1	4

0 (0 out of 1708 Selected)

TennisMatchData

Menggunakan file geodatabase untuk menyimpan data olahraga di ArcGIS



Atlet memakai perangkat GPS di punggung mereka.  
(Harlequins / Catapult)

#### Inertial sensors

##### **Gyroscopes:**

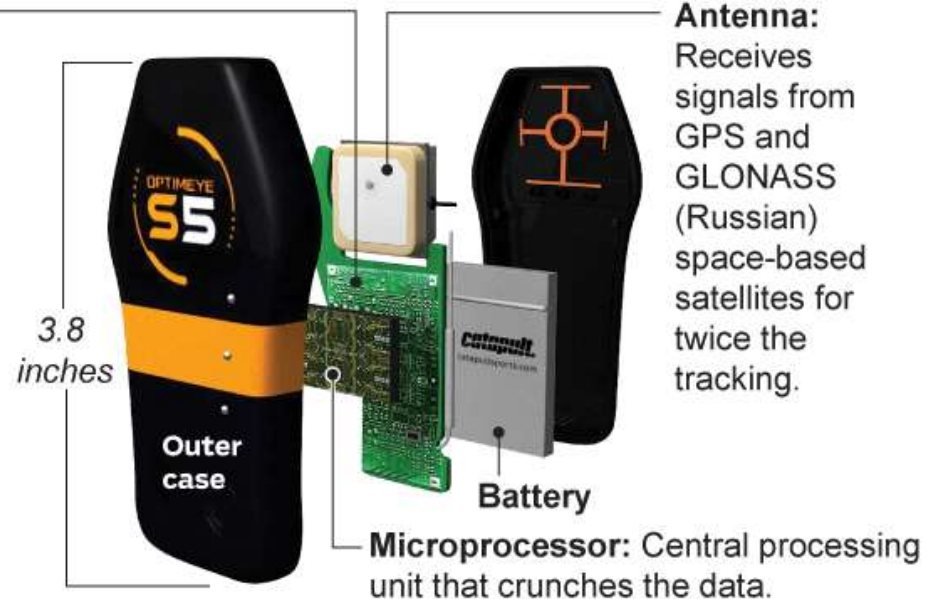
Measure the orientation of the athlete's body position.

##### **Accelerometers:**

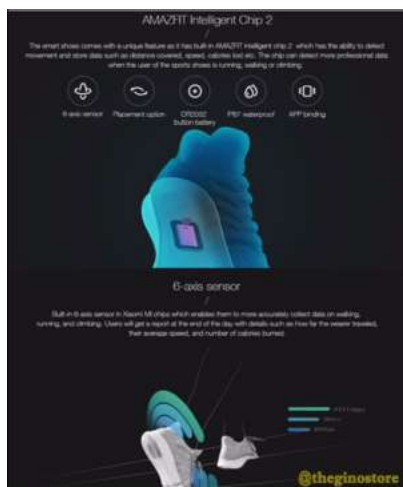
Measure impact forces.

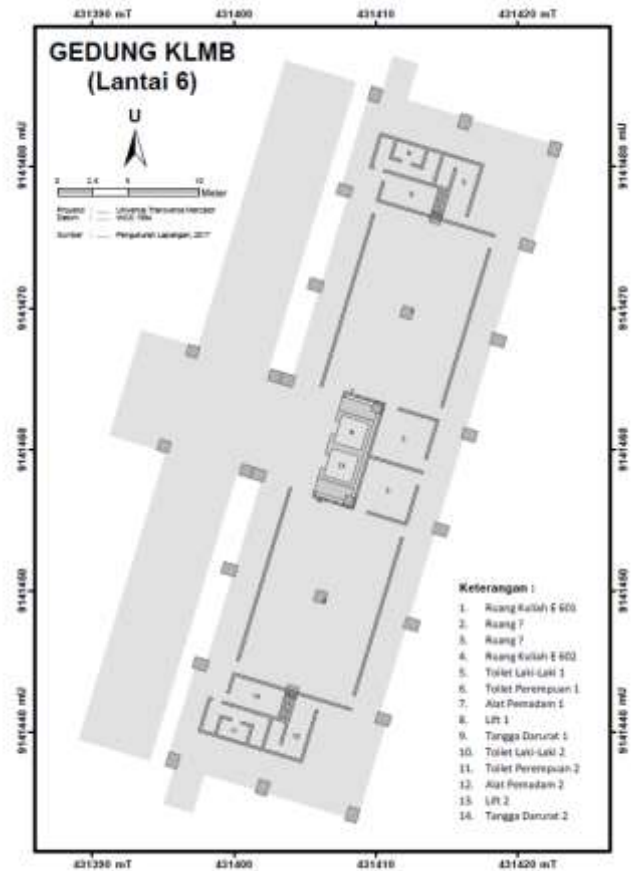
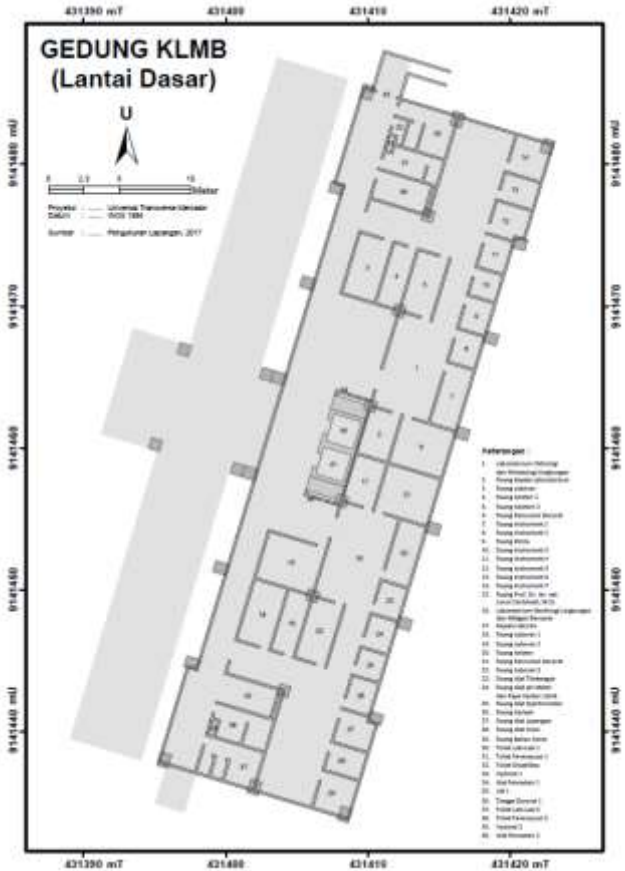
##### **Magnetometers:**

Measure direction like a digital compass.

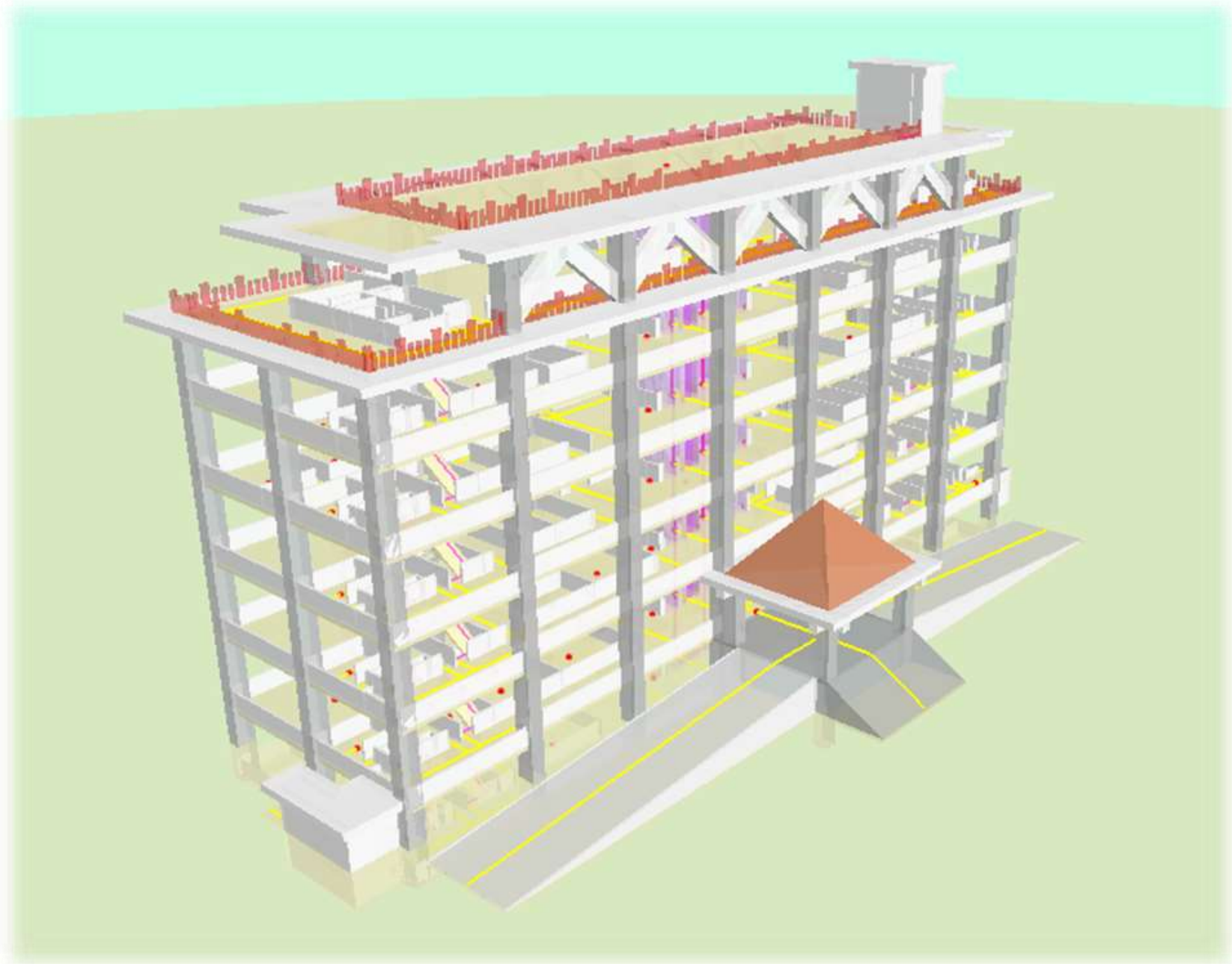


# SMART SHOES RUNNING SNEAKER XIAOMI MIJIA CHIP IP67 - SEPATU PINTAR



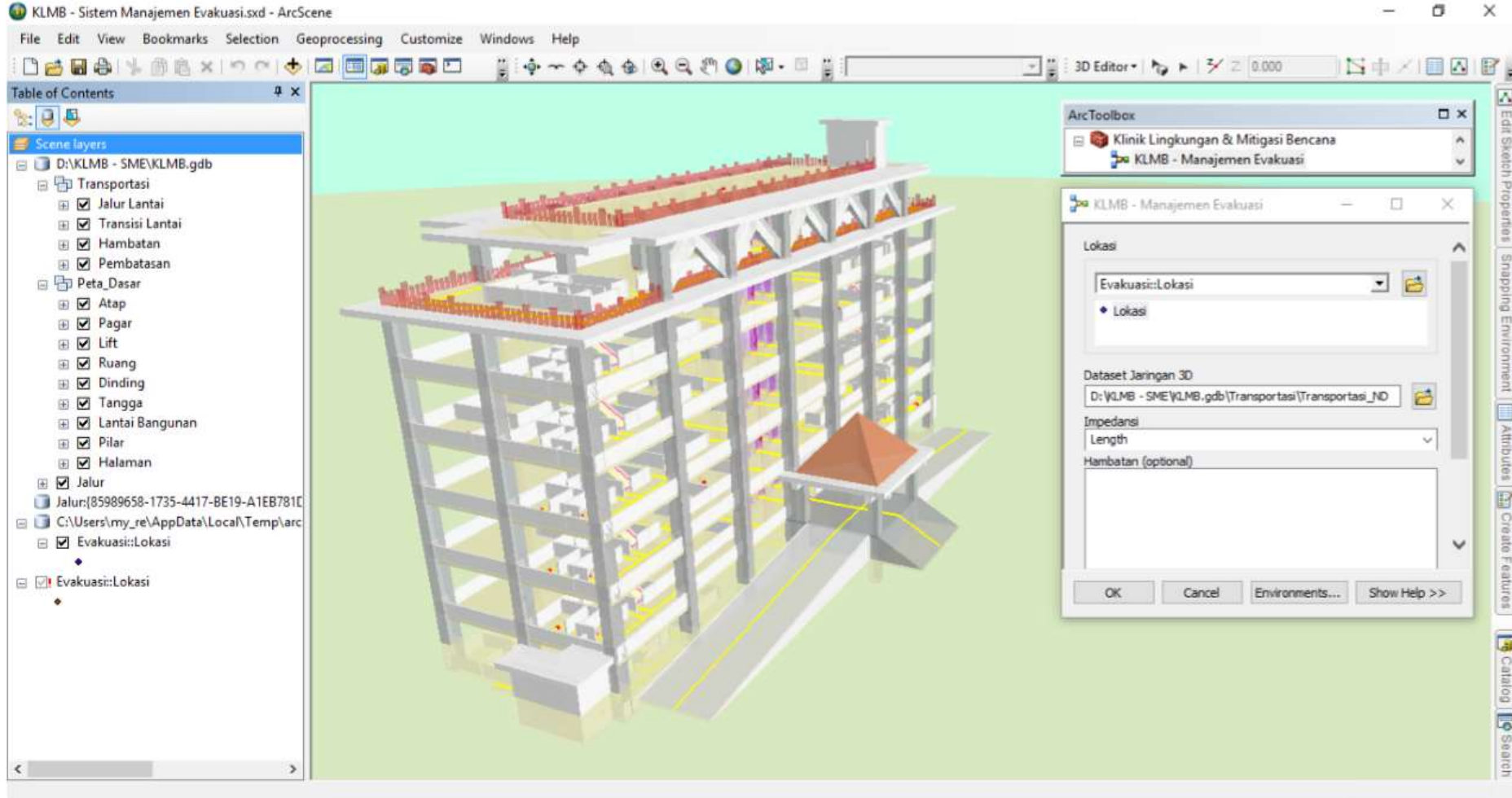


**Simulasi Evakuasi jika terjadi Gempa bumi besar di Gedung KLMB Fakultas Geografi UGM dengan Agent Based Model (ABM)**

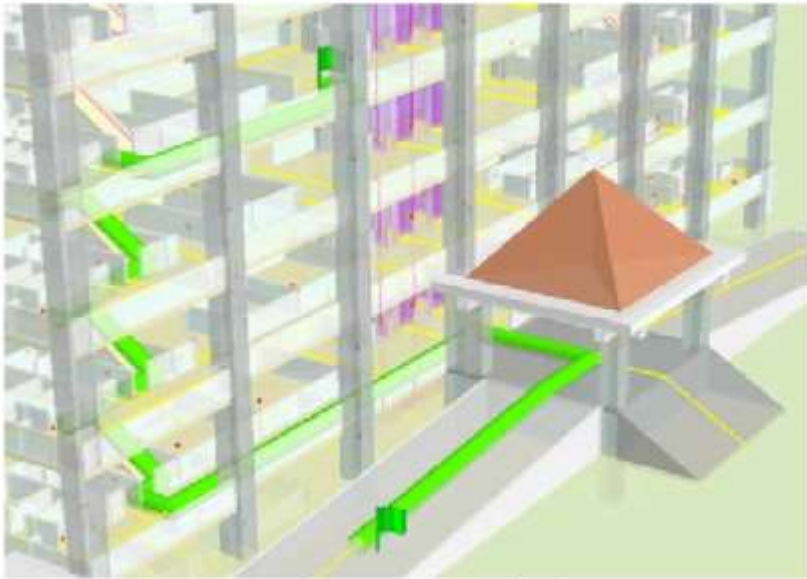


***Model 3D Gedung KLMB***

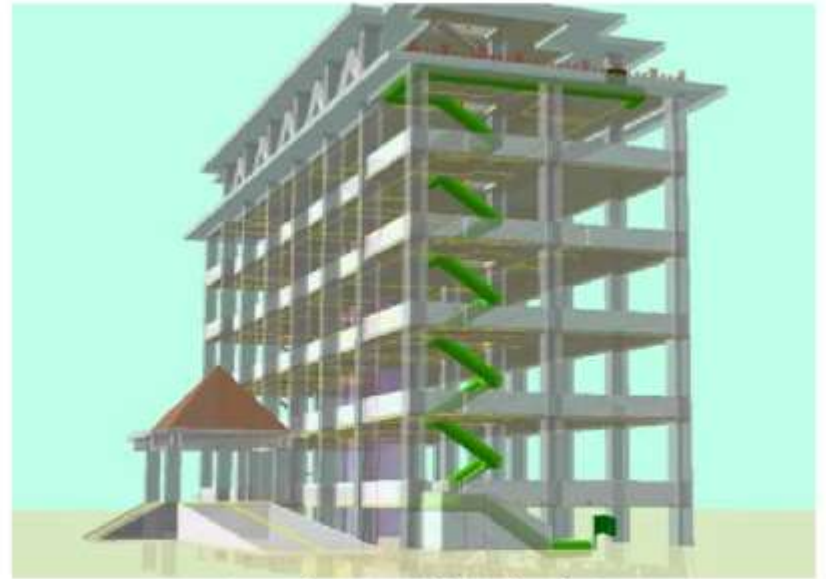




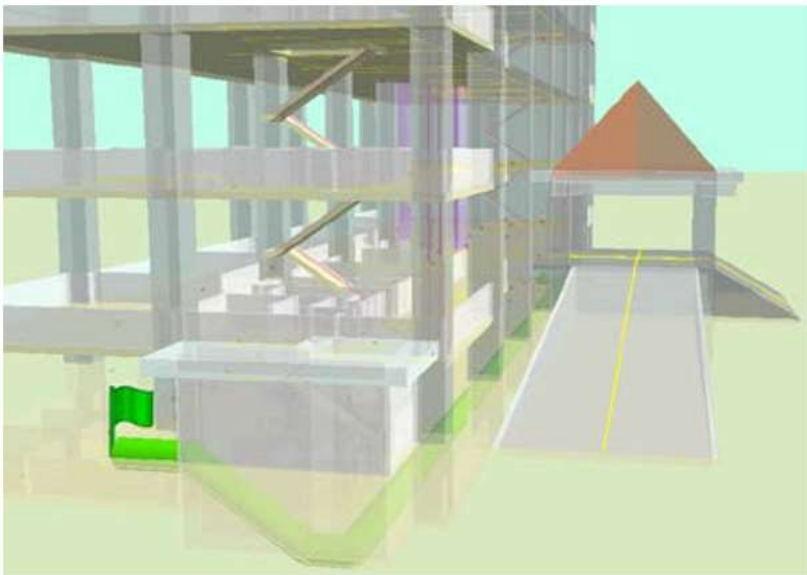
Interface Utama Sistem Navigasi dan Manajemen Evakuasi "KLMB-SME" dalam Environment dari ArcScene pada ArcGIS 10.3.



Gambar 8. Simulasi 1.



Gambar 9. Simulasi 2.



Gambar 10. Simulasi 3 (Tampak Samping).



Gambar 11. Simulasi 3 (Tampak Depan).

File Home Share View Manage Drive Tools MAWADDAH (D:)

Clipboard: Pin to Quick access, Copy, Paste, Copy path, Paste shortcut

Organize: Move to, Copy to, Delete, Rename

New: New folder, New item, Easy access

Open: Properties, Edit, History

Select: Select all, Select none, Invert selection

Address bar: D:\ Search MAWADDAH (D:)

- Quick access
  - Desktop
  - Downloads
  - Documents
  - Pictures
- MAWADDAH (D:)
- Desktop
- Rendy Putra Muretika
- This PC
  - A360 Drive
  - ASUS\_ZOORD
  - Desktop
  - Documents
  - Downloads
  - Music
  - Pictures
  - Videos
  - SAKINAH (C:)
  - MAWADDAH (D:)
  - WARAHMAH (E:)
  - DVD RW Drive (F:)
  - CD Drive (G: ASUS Z...

This folder is empty.

Taskbar: Windows Start button, Search bar (Type here to search), Taskbar icons (File Explorer, Edge, Chrome, etc.), System tray (Volume, Network, etc.)



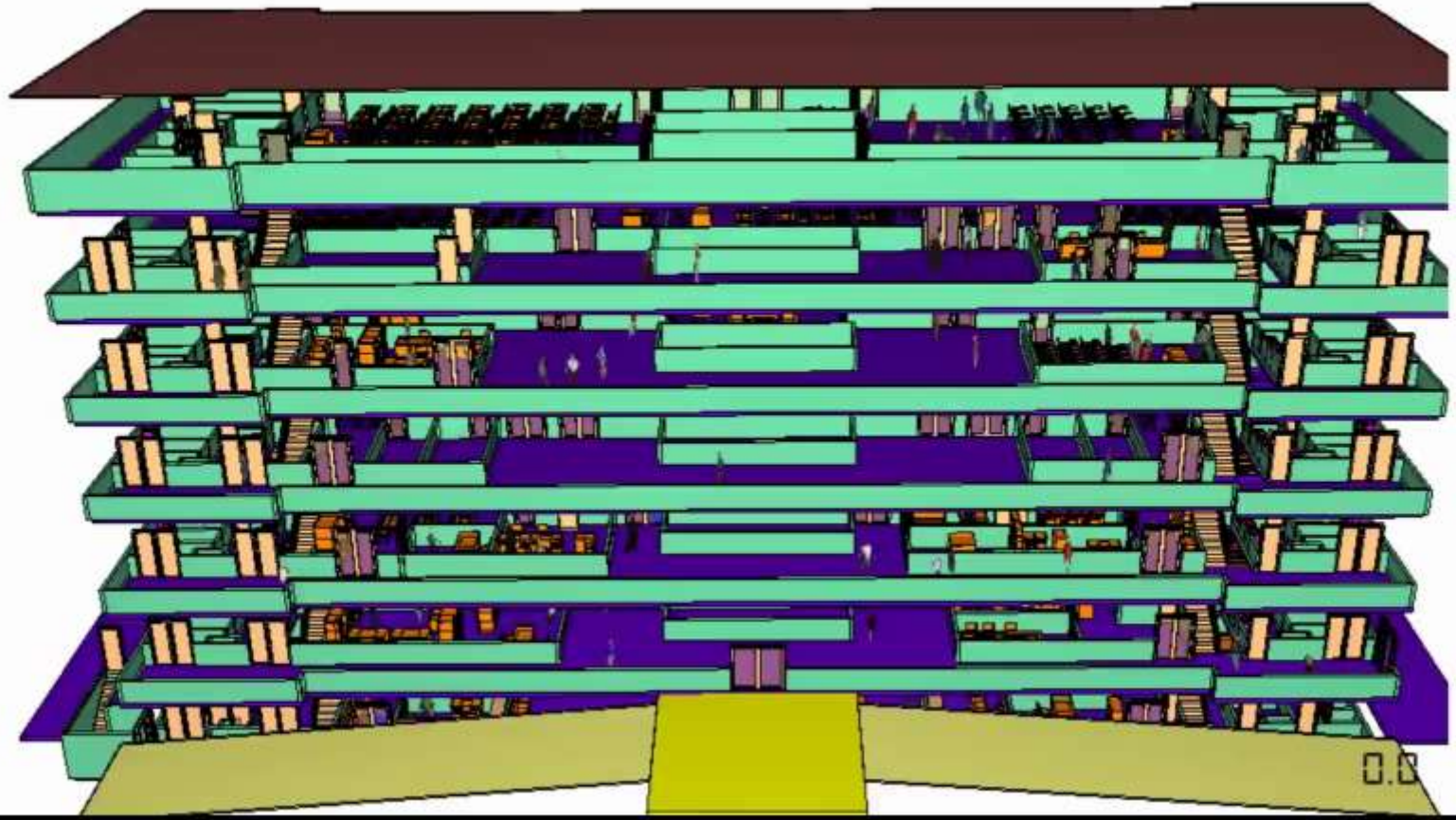
Exited: 0/76



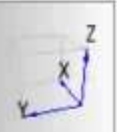
0.0

Exited: 0/231

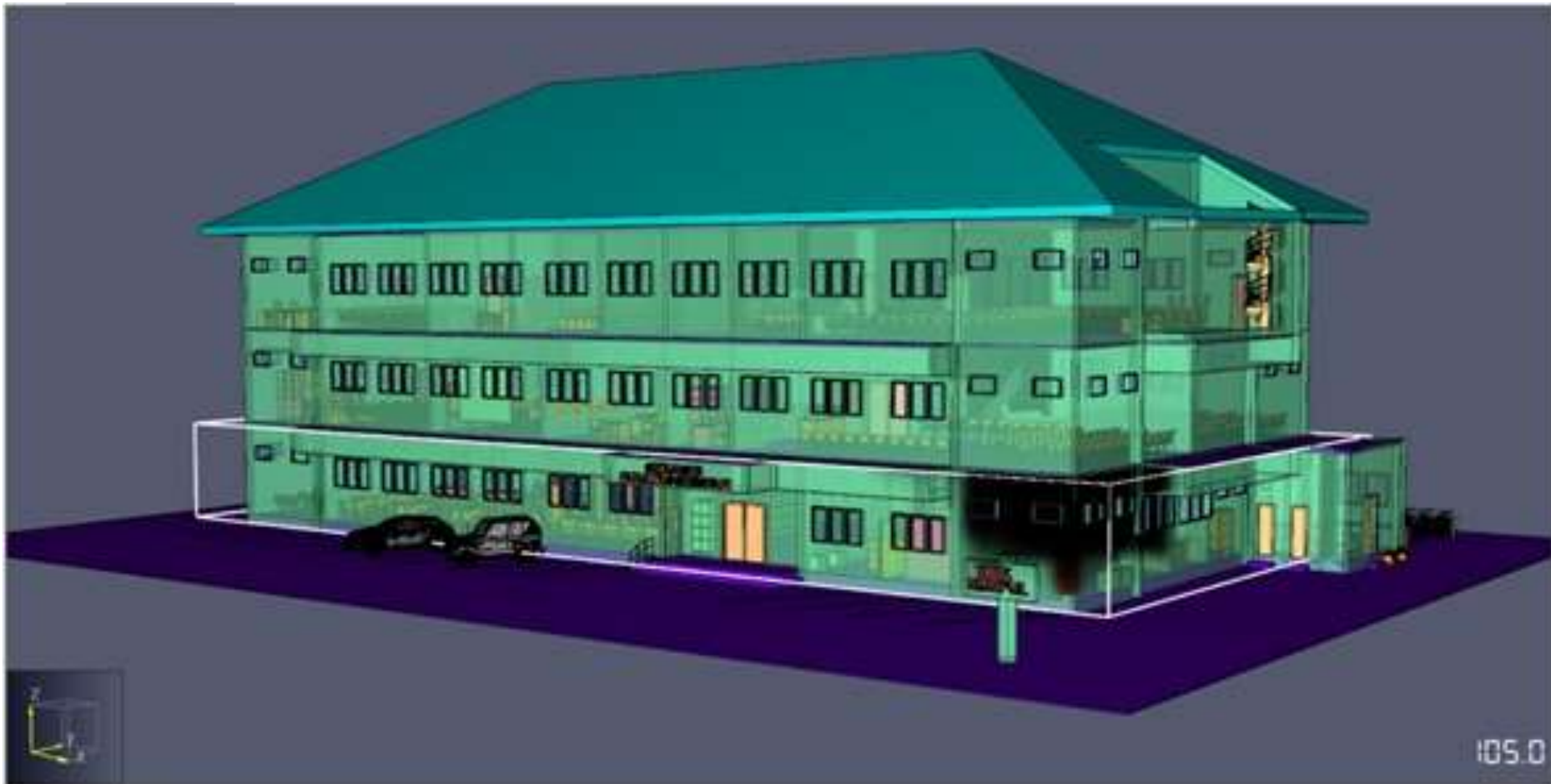
Density  
(occs/m<sup>2</sup>)



- 3
- 2.755
- 2.51
- 2.265
- 2.02
- 1.775
- 1.53
- 1.285
- 1.04
- 0.795
- 0.55

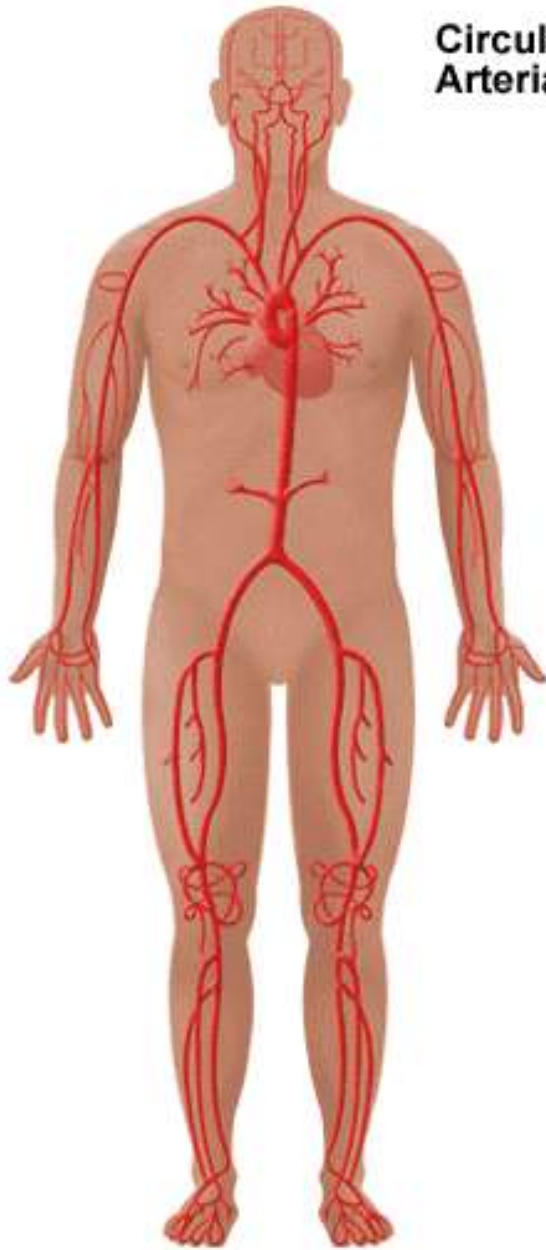


0.8

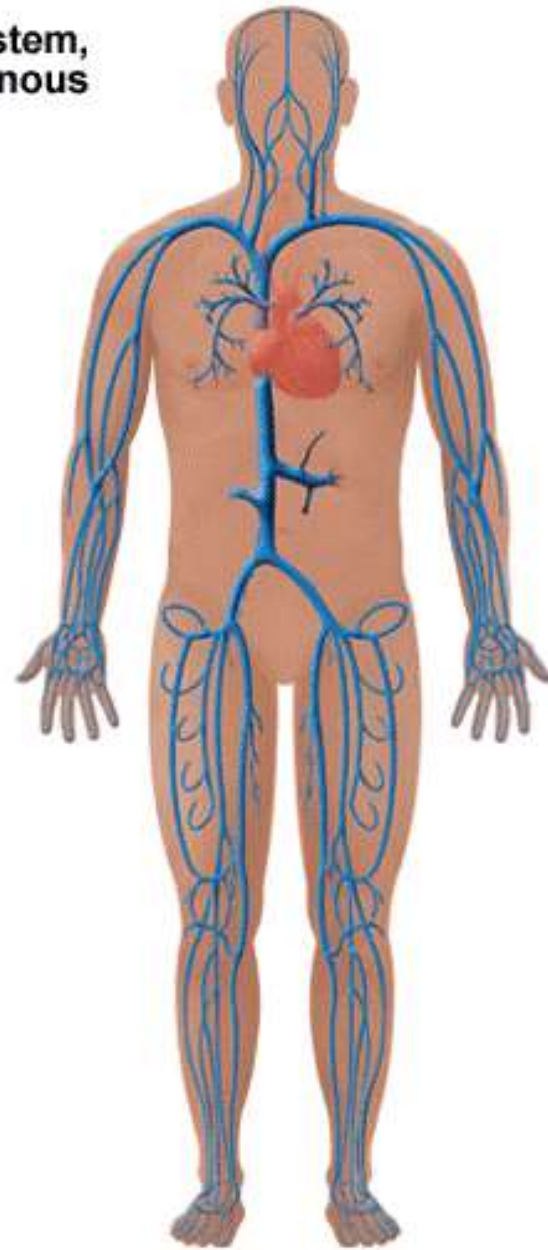


Simulasi Kebakaran Gedung B Fakultas Geografi UGM

# Circulatory System, Arterial and Venous



Arterial



Venous



**SEKIAN**