GEOAI Skill Needs Survey – Private Sector

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Definition: GeoAI is the amalgamation of artificial intelligence (AI) with spatial computing to develop a better understanding of the physical world around us at the levels of an individual, communities, cities, nations, and the planet using geospatial data.
Geographical Representation

24 Countries Represented by Respondents
GEOAI Survey – Association Memberships

- UN-GGIM Private Sector Network: 21
- Open Geospatial Consortium (OGC): 11
- World Geospatial Industry Council (WGIC): 6
- None of these: 12
Findings from Private Sector Survey

GeoAI Capabilities:
- 31% Lack GeoAI Talent
- 69% Good GeoAI capabilities

Upskilling Plans:
- 38% Upskilling employees
- 62% Difficult to recruit
Findings from Private Sector Survey

Do University Graduates have Required Skills for GeoAI Jobs?

- Yes: 69%
- No: 31%

Easier to upskill Geo degree holders or Computer Science

- Computer Science/Al: 50%
- GIS/Geomatics: 50%
Findings: Skillsets sought

- Programming, and software development: 25 (59.5%) out of 42
- GIS, mapping/visualization, and analysis: 33 (78.6%) out of 42
- Data engineering capabilities: 29 (69%) out of 42
- Application domain expertise: 22 (52.4%) out of 42
- ML Operations (ML-Ops) knowledge: 24 (57.1%) out of 42
- Computer Science degree: 13 (31%) out of 42
- Geography/GIS degree: 15 (35.7%) out of 42
- Coding, programming, and software development: 7 (16.7%) out of 42
Findings from Private Sector Survey

Almost Unanimous Agreement on

- AI & geo skills requirements – both foundational and analytical
- Keeping-up with scientific and tech advances in GeoAI research

95%

- e-Learning resources/Just in time training
- Social media based knowledge management
- Standards Group for GeoAI

Community Resource Needs

- GeoAI Hub: 70%
- e-Learning: 19%
- Other ideas: 11%
Skills and Competencies Required

**GEO AI Solutions**

**Geospatial Science**
- GIS e.g. ArcGIS, QGIS, etc.
- Spatial Databases e.g. PostGIS, Oracle Spatial, H3
- Spatial data science
- Remote sensing (raster), vector & point cloud data analysis

**Artificial Intelligence**
- Machine learning: SVM, regression, clustering, PCA
- Deep learning: CNNs, Transformers
- Graph analysis: GNN
- Math: linear algebra, stats, probability, calculus, etc.

**Domain Knowledge**
- Data structure and data selection
- Model architecture design
- Loss function design to ensure models learn the right thing

**Computational Skills**
- Python, JavaScript, PyTorch, API development, container management and cloud deployment skills
- Data engineering and management: Querying, processing, fusion/harmonization,

**Ethics and Safety Considerations**
- Know and tackle biases due to geographical data availability (or lack), scale, problem selection, etc.
- Manage data privacy issues through consent, self-determination and subsidiarity in data governance
Next phase: Multimodal GeoAI foundation models (FM) for answering spatiotemporal and retrieval queries in natural language.

Question: When everyone becomes a GeoAI FM user, what kind curriculums would be required?
Questions