- Cancer Screening Portal Focus: Prioritizing cervical cancer for the portal due to impactful data and high potential for diagnostic support.

- Data Collaboration Needs: Real and synthetic data will be utilized; challenges in labeling, image resolution, and data quality must be addressed.

- ICU Project Deferred: ICU medical error reduction project on hold due to vague scope and existing monitoring systems already generating alerts.

- Carpooling Project Educational: Carpooling recognized as solved, serving as a learning opportunity rather than a new solution needed in the market.

- Web Scraper Development: Multimodal web scraper targeted for lead generation, focusing on API integration and social media for effective data extraction.

- Parallel Project Support: Team to pursue cancer screening and scraping projects, with ongoing mentorship and emphasis on maintaining clear project scopes.

Notes

Cancer Screening Portal Development

The team decided to prioritize building a cancer screening portal starting with cervical cancer due to data availability and high impact potential (03:38).

- Ravi Kumar Prasada outlined the plan to develop a portal focusing on cervical cancer using both real and synthetic data, leveraging extensive access to gynecologist networks and public medical image repositories to ensure a diverse dataset.
    - The portal will include multiple verticals for different cancer types, starting with cervical cancer as a proof of concept.
    - Synthetic data generation code is ready and will supplement real data to address data scarcity.
    - The project aims to assist doctors and patients by providing diagnostic support through analysis of pathological slides and pap smear images.
    - Ravi will use a tech stack including Streamlit, Next.js, FAST API, Postgres, Vector DB, PyTorch, and Triton inference server, seeking advice on deployment strategies.
- Ramanathan Rm emphasized the importance of scope clarity and data quality for delivery within one month (10:17).
    - He advised testing whether existing large language models (LLMs) like ChatGPT or Claude can interpret cancer-related images before investing in model training.
    - He highlighted the need to manage image sizes below approximately 100 KB to reduce inference costs and latency.

    - Ramanathan stressed verifying whether the data is labeled, specifying cancer regions, which is critical for training or fine-tuning models.
    - He noted that the project's success hinges on overcoming challenges related to data resolution, labeling, and delivering consistent, reliable diagnostic outputs required in healthcare.
- The project's strategic value lies in its sophistication and potential for real-world impact (46:00).

    - Ramanathan identified cancer screening as a high-impact healthcare application with regulatory challenges but strong long-term potential.
    - He encouraged leveraging existing LLM capabilities and medical expert feedback to validate outputs before considering custom model development.
    - The team acknowledged the importance of collaboration with medical professionals and compliance with emerging electronic health record (EHR) mandates, especially in Andhra Pradesh.
    - Ravi committed to ongoing interaction with Ramanathan for data and technical guidance, recognizing data challenges as central to project success.

ICU Medical Error Reduction Project

The ICU-focused project to reduce medical errors was deferred due to unclear solution scope and data challenges (29:10).

- Ramanathan advised parking the ICU project temporarily because the problem statement and final deliverable were vague despite the high medical need to reduce the 20-30% mortality rate linked to medical errors (29:10).

    - The team aimed to build agents monitoring EMR data, vital signs, lab results, and protocols to alert doctors of critical conditions.
    - Ramanathan pointed out that existing ICU monitoring systems already generate alerts, so the project needs a clear AI/ML added value.
    - Lack of access to real-time ICU data and uncertainty about the use of images or text limited feasibility.
    - The team agreed to simulate the solution with available structured data but lacked clarity on demo deliverables.
- Ramanathan highlighted that ICU data is mostly structured and may not require LLMs for initial modeling (27:53).

    - He suggested focusing on AI/ML models for risk categorization rather than generative AI.
    - The team recognized the need for a clear end-to-end solution narrative to guide development and demonstration.
    - The decision to defer allows focusing resources on projects with clearer data and impact paths.

Smart Carpooling Application

The carpooling project was recognized as a good learning exercise but a solved problem with existing solutions (32:00).

- Ramanathan explained that carpooling with route optimization is a well-established problem solved by companies like Uber and Quick Ride using operations research algorithms (32:17).
    - The team plans to apply LLMs to optimize carpooling routes and group employees by location using GPS and Google Maps APIs.
    - Ramanathan advised researching classical routing and scheduling algorithms to understand existing solutions before applying LLMs.
    - The project's main value is educational, helping the team gain experience in applying LLMs to optimization problems.
    - The approach involves feeding Excel sheets with employee data and letting LLMs propose optimized carpools and routes.

Multimodal Web Scraper for Lead Generation

A focused multimodal web scraper targeting business lead generation was prioritized for its market relevance and scalability (37:00).

- Sanskar Malviya aims to build a web scraper that combines API calls and screen scraping to extract data from multiple sources, including social media platforms, bypassing rate limits and paid subscriptions (37:04).
    - Ramanathan emphasized narrowing the scope specifically to lead generation to maintain solution focus and scalability.
    - He suggested leveraging existing API marketplaces like rapidapi.com for scraper APIs to accelerate development.
    - The solution targets startups and small businesses that cannot afford large marketing agencies but need reliable lead data.
    - Ramanathan encouraged benchmarking existing lead generation tools and focusing on social media platforms like LinkedIn and Facebook.
- The project addresses an evergreen demand for business leads with potential for wide adoption if successfully executed (43:00).
    - The team must balance ambition with practical scope to create a saleable and maintainable product.
    - Ramanathan cautioned against overly broad scraping to avoid losing focus and increasing complexity.
    - The emphasis on multimodal scraping reflects an effort to integrate diverse data sources and formats for richer lead profiles.
    - Sanskar demonstrated knowledge of bypassing premium subscription barriers, enhancing the scraper's competitiveness.

Project Selection and Support Strategy

The group agreed to proceed with the cancer screening and web scraping projects due to their uniqueness and feasibility, with carpooling and ICU projects deprioritized or parked (46:30).

- Ramanathan advised pursuing multiple projects in parallel if resources allow but stressed confirming with Outskill about presenting more than one project on demo day (46:30).

    - The cancer project offers high impact and technical complexity, suitable for showcasing advanced AI capabilities.
    - The web scraper project provides practical business value with a clear market need.
    - Carpooling is straightforward and can serve as a fallback learning project.
    - ICU project was parked due to unclear solution delivery and testing challenges.
- Mentorship and support from Outskill and Ramanathan are available for all chosen projects (47:45).
    - The team can schedule brainstorming sessions to unblock issues and receive guidance.
    - Ramanathan acknowledged limits of his expertise in multimodal AI and image processing and recommended seeking specialized mentors if needed.
    - Continuous interaction with Ramanathan is expected, especially on data-related challenges for the cancer project.
    - The group plans follow-up discussions to deepen focus on cancer screening development.
- Ramanathan highlighted critical success factors including data quality, labeling, image resolution, and regulatory considerations (50:30).
    - He reinforced that data readiness is more important than model complexity.
    - The team was advised to validate LLM outputs on medical images early to assess reliability and avoid unnecessary model building.
    - Regulatory and privacy issues like HIPAA and PII handling were discussed, with plans to mask data where needed.
    - The healthcare domain is challenging but offers untapped potential for AI-driven transformation.

Action items

Ravi Kumar Prasada

- Ravi Kumar Prasada to share the cancer screening Excel sheet link with Ramanathan for project reference (00:02)
- Ravi to test ChatGPT, Claude, Gemini capabilities with sample medical images to validate baseline diagnostic output before custom model building (09:26)
- Ravi to consult image processing and multimodal LLM mentors for guidance on model deployment and GPU usage for cancer image classification (47:40)

Rahul

- Rahul to pause ICU medical error reduction project and revisit with clearer problem definition and demonstrable deliverables (29:55)

Sandeep

- Sandeep to research classical operations research optimization methods used in carpooling applications and explore applying LLM for route optimization (32:17)

Sanskar

- Sanskar to focus multimodal web scraper scope on lead generation for startups and small businesses, and research existing API-based scraping solutions like rapidapi.com (38:30)

Unassigned

- All team members to check Out skill guidelines on submitting multiple projects for demo day and coordinate presentations (46:30)
- Team to explore anonymization/masking approaches for patient data to address privacy concerns in healthcare datasets (57:30)
- Prepare demo presentations highlighting doctor endorsements and potential real-world impact for project buy-in from Outskill (58:30)

Rahul, Ravi, Sanskar, and Sandeep

- Rahul, Ravi, Sanskar, and Sandeep to continue collaboration on cancer screening and web scraper projects and schedule follow-up call for cancer project deep dive (59:15)

ON CANCER PROJECT

- Cancer screening platform
  Summary: Building an image-based screening portal (cervical cancer proof-of-concept) using real + synthetic data, LLMs, and imaging models; data quality and labels are critical.
    - Use pathological slides and Pap-smear images (JPG/PNG) as primary inputs for detection and diagnostics.
    - Start by testing existing multimodal LLMs (ChatGPT / Claude / Gemini) on sample images to gauge reliability.
    - Address data challenges: high resolution, size reduction, focused ROIs, and label granularity (region vs. image-level).
    - Decide whether to fine-tune models or rely on API-based inference to avoid heavy GPU costs.
- Data sourcing & labeling
  Summary: Emphasis on finding, aggregating, masking, and labeling real medical data; supplement with public repositories and synthetic data generation to overcome scarcity and privacy.
    - Leverage public medical imaging repositories and clinicians/ gynecologist contacts for labeled datasets.
    - Generate synthetic data (existing code available) to augment training and balance classes.
    - Implement PII masking/obfuscation and consider local/regulatory requirements (HIPAA noted for US contexts).

    - Plan labeling scope: image-level cancer presence vs. pixel/region-level annotations for segmentation tasks.
- Model & infrastructure choices
  Summary: Discuss front-end (Streamlit/Next.js), backend (FastAPI), databases (Postgres, vector DB), ML frameworks (PyTorch, Triton), and trade-offs between hosted LLM APIs vs. self-hosted models.

    - Use LLM APIs for multimodal inference to avoid initial GPU/ hosting overhead; self-host only if building custom image models.
    - Consider Triton or custom inference server if deploying trained models at scale; seek mentor help for setup.
    - Use vector DB for RAG workflows and Postgres for structured patient/meta data.
    - Employ PyTorch, diffusers, and CV toolkits for imaging pipelines,QC, and potential fine-tuning.
- Prototype scope & demo strategy
  Summary: Narrow, realistic deliverables for capstone: define final demo output (diagnosis, region marking, or risk score), simulate ICU/data if needed, and avoid over-ambition.

    - Decide minimal viable deliverable (e.g., 10 images → LLM diagnosis + confidence) for demo day.
    - Simulate streaming/real-time data where direct hospital access is impossible; use curated datasets to validate workflows.
    - Prioritize reproducibility and consistency of outputs to satisfy healthcare expectations.
    - Check with course provider (Outskill) on presenting multiple projects and mentor availability for unblock sessions.

- Alternative project options
  Summary: Evaluated other team ideas: web-scraper for lead generation (multimodal scraping), carpool optimization, and ICU monitoring; prioritized cancer and web-scraper for impact and feasibility.

    - Web-scraper: focus on lead generation from social platforms, define scope, and leverage APIs/rapidapi rather than broad scraping.
    - Carpool: solved problem (Uber/Quick Ride); use LLM for optimization prompts but lower novelty.
    - ICU monitoring: rich healthcare impact but unclear deliverables and high simulation/testing complexity; recommended to park.

- Collaborate with domain experts (nephrologist) to validate clinical projects and improve adoption chances.