Week 1: Neurosurgery and AI in MRI Analysis

- **Morning (Clinics)**
  Neurosurgery clinic exposure as planned.

- **Afternoon (Case Identification and AI Integration)**

  o **AI Tool Integration:**
    Introduce residents to AI tools such as **Aidoc** and **Zebra Medical Vision** for MRI analysis. After selecting a case in the clinic that involves MRI imaging (e.g., a patient with a brain tumor or hydrocephalus), residents will use the AI tools to analyze the MRI and compare the results with manual interpretations. They will be encouraged to explore how AI models help identify brain anomalies and expedite urgent case reviews.

    ▪ **Hands-on Training:**
      Residents will perform MRI reviews using **Aidoc** and **Zebra Medical Vision** to detect abnormalities such as brain tumors, mass effects, or structural issues. They will document how AI flagged key findings compared to manual analysis.

    ▪ **Objective:**
      Understand the role of AI in improving speed and accuracy in MRI interpretation, reducing human error, and prioritizing critical cases.

Week 2: Genetics and AI in Genomic Evaluation

- **Morning (Clinics)**
  Genetics clinics as planned.

- **Afternoon (Case Identification and AI Integration)**

  o **AI Tool Integration:**
    Residents will be introduced to AI tools like **DeepVariant**, **Fabric Genomics**, and **Illumina DRAGEN Bio-IT Platform**. They will use these tools to assist in analyzing genomic data for patients with rare diseases or genetic syndromes seen in the clinic. AI tools can automate variant calling and classification, aiding in diagnosis.

    ▪ **Hands-on Training:**
      Residents will be given patient genetic data (from clinic cases) to run through platforms like **DeepVariant** and **Fabric Genomics**. They will

identify potential variants and understand how these tools support diagnosing rare conditions.

- **Objective:**
  Learn how AI streamlines genomic evaluation, accelerates variant interpretation, and improves the accuracy of diagnosing genetic disorders. Residents will compare traditional manual sequencing interpretations with AI-augmented approaches.

Week 3: Neurology and Neuroradiology – AI in EEG and MRI

- **Morning (Clinics)**
  Neurology and neuroradiology clinics as planned.

- **Afternoon (Case Identification and AI Integration)**
  This week will focus on AI tools for both EEG and MRI in neurology cases.

  - **EEG AI Tools:** Introduce residents to **Persyst EEG Analysis Software**, **Epilog**, and **Nervive** to help analyze EEG data. When seeing a neurology case (e.g., epilepsy or abnormal brain activity), residents will upload EEG recordings into the AI tool, which can detect seizures, spikes, and abnormal activity more efficiently.

    - **Hands-on Training:**
      Residents will run EEG recordings through **Persyst** and **Nervive**, then evaluate how AI-automated results compare to their manual interpretations.

    - **Objective:**
      Understand the potential of AI in real-time EEG interpretation and how it enhances seizure detection and spike analysis, especially in long-term monitoring or during video EEG evaluations.

  - **MRI AI Tools:** Continue using AI tools from Week 1 (**Aidoc** and **Qure.ai**) for neuroradiology cases to identify neurological abnormalities on MRI scans (e.g., stroke, multiple sclerosis lesions, or structural brain abnormalities).

    - **Hands-on Training:**
      Focus on applying **Qure.ai** in neuroradiology, comparing AI-driven interpretations of MRIs with resident's own evaluations.

Week 4: Case Synthesis and Presentation

- **Morning (Clinics)**
  Continuation of clinic participation with the specialties as in previous weeks, finalizing case selection.

- **Afternoon (Case Review and Presentation Preparation)**
  In this final week, residents will focus on synthesizing the cases they have worked on throughout the rotation and incorporating AI-driven insights into their grand rounds presentation.

  - **Case Pooling:**
    Residents will choose 4 representative cases that demonstrate the integration of AI tools across EEG, MRI, and genomic evaluation. They will explain the differences between AI-augmented and traditional clinical practice, showcasing the specific tools they used.

  - **Pediatric Grand Rounds Presentation:**
    The presentation will highlight:

    1. **EEG Case:** How **Persyst** or **Epilog** assisted in identifying seizure activity, improving diagnosis and management in epilepsy.

    2. **MRI Case in Neurosurgery/Neuroradiology:** How **Aidoc** flagged an urgent brain lesion, leading to quicker surgical intervention.

    3. **Genomic Case:** How **DeepVariant** or **Fabric Genomics** accelerated the diagnosis of a genetic disorder in a pediatric patient, improving the treatment plan.

    4. **Neurology Case:** How AI-enhanced MRI readings with **Qure.ai** helped identify subtle signs of early multiple sclerosis or stroke.

  - **Objective:**
    By presenting these cases, residents will demonstrate their ability to integrate AI tools into clinical workflows, highlight improved diagnostic accuracy, and reflect on the limitations and ethical considerations of AI in patient care.

Additional Resources for Self-Learning:

- **Online Modules:** Residents will be provided with access to online learning modules and tutorials from these AI platforms for further exploration.

- **Mentor-Led Workshops:** Weekly seminars with specialists in neurosurgery, neurology, and genetics to discuss AI's role in their fields.