Engineering and Computing
UNIVERSITY OF SOUTH CAROLINA

School of Medicine Columbia
UNIVERSITY OF SOUTH CAROLINA

**Welcome to the AI in Medicine Extracurricular Track!** A unique interdisciplinary initiative offered by the USC School of Medicine and the USC School of Engineering and Computing, supported by the USC Arnold School of Public Health.

**Program Overview:** Dive into the transformative world of Artificial Intelligence in medicine through our comprehensive, hands-on extracurricular track. This curriculum is designed to equip medical students with a deep understanding of AI's core concepts and its applications in healthcare—from predictive analytics to medical imaging.

**What Will You Learn?**

- **Fundamentals of AI, Machine Learning, and Data Science**
- **Expert Systems and Decision Trees**
- **Neural Information Processing and Artificial Neural Networks**
- **Training and Testing Neural Networks with Backpropagation**
- **Predictive Analytics and Adapting to New AI Tools**
- **Large Language Models in Healthcare**
- **Medical Imaging Meets Deep Learning**
- **Data, Ethics, and the Future Landscape of AI in Medicine**

**Curriculum Structure:**

- Spanning Years 2 to 4 of Medical School.
- A series of progressive lectures and projects aligned with your medical education.
- Projects aimed at real-world applications, guided by faculty and aimed at possible publication.

**Mentorship and Guidance:** Under the expert supervision of Drs. Bonilha and Valafar, alongside other faculty members, students will receive tailored mentorship to deepen their understanding and practical skills in AI applications.

**Year-by-Year Breakdown:**

**Year 2 (MS2)**

- **Fall Semester:**
    - **Lecture 1:** AI, ML, Deep Learning, Data Science.
    - **Lecture 2:** Expert Systems and Decision Trees.
    - **Projects:** Apply AI to diagnose epilepsy from MRIs, use neural networks to predict disease progression.

**Year 3 (MS3)**

- **Fall Semester:**
    - **Lecture 3:** Neural Networks and Backpropagation.
    - **Lecture 4:** Neuro Information Processing and ANNs.
    - **Lecture 5:** Predictive Analytics in Medicine.
    - **Projects:** Analyze ECG readings for heart disease, support diagnosis with expert systems, predict patient readmission rates.
- **Spring Semester:**
    - **Lecture 6:** Large Language Models Beyond Chatbots.
    - **Lecture 7:** Medical Imaging Meets Deep Learning.
    - **Projects:** Employ ChatGPT for clinical research, detect vascular lesions in scans.

**Year 4 (MS4)**

- **Fall Semester:**
    - **Lecture 8:** Data, Ethics, and the Future Landscape of AI in Medicine.
    - **Discussion:** AI's implications on future medical practices and the doctor-patient relationship.

**Getting Started:**

- **Introductory Lecture:** May 3rd, 1-2 PM, M1 Classroom. An overview of AI in Medicine.
- **Enrollment:** Summer between M1 and M2 years. Limited to 10 students per class based on grades, MCAT scores, and a passion for AI showcased in an application essay.
- **Application:** REDcap applications open on June 1$^{st}$ and close on June 30$^{th}$. Decisions will be made before the start of the academic year.

**Join Us to Shape the Future of Healthcare with AI!** Let AI in Medicine be your pathway to becoming a visionary in healthcare!

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