XimuAlpha4CFD流程图

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| 功能 | 程序 |
| 配置环境和嵌入之后，用run\_pipeline.sh运行主程序src/alphaOpenfoam\_v2.py，读取输入文件.yaml | config\_file\_path inputs/CylinderFlow.yaml  ./workspace/config/config2.yaml has been updated successfully. |
| 添加环境，承载一批角色，角色可以向环境发布消息，可以被其他角色观察到 | base\_env.py: |
| 识别用户需求 | usr\_requirment：do a RANS simulation of flow around a cylinder using simpleFoam. |
| runtimes: 1 | |
| 启动角色Architect及其Action，设定用户需求解决方案框架，找到tutorial中相似算例，细分子任务 | Architect.py: roles.Architect:  act:26 - Zhuxu: to do ArchitectAction(ArchitectAction) |
| 子任务1：在tutorial中找到case  保存find\_tutorial.txt | find\_case page\_content="case name: cylinderAndBackground  File saved successfully at /data/sda/lichenshuo/XiMuAlpha4CFD/run/Cylinder\_Flow\_1/find\_tutorial.txt |
| 子任务2：细分写文件任务 | actions.ArchitectAction:run:111 - ```splits into 12 subtasks: |
| 启动角色InputWriter及其Action，根据子任务和算例模板生成相应文件 | InputWriter.py:  roles.InputWriter:\_act:24 - Yuxuan: to do InputWriterAction(InputWriterAction) |
| 子任务1：在openfoam\_tutorials.txt中找到要写入的相似文件 | tutorial\_file: None  find\_similar\_foamfile: Based on the provided context, the foamfile for 'U' in '0.orig' of the case named 'Cylinder\_Flow\_1' most closely matches the input U file of case cylinderAndBackground. This is because the cylinderAndBackground case is described as being in the incompressible domain, category cylinder, and using the solver overPimpleDyMFoam, which is likely to be relevant for a case involving flow around a cylinder. |
| 子任务2：根据模板生成输入文件到case | find\_tutorial\_file: input U file of case cylinder (domain: basic, category: None, solver:potentialFoam) in 0.orig folder: |
| 启动角色Runner及其Action，生成Allrun文件开启OpenFOAM流动计算进程。 | Runner.py:  roles.Runner:\_act:20 - Foamer: to do RunnerAction(RunnerAction) |
| 启动角色Reviewer及其Action，重新唤起InputWriter和Runner，判断是否生成文件。 | Reviewer.py:  roles.Reviewer:\_act:22 - Xingyu: to do ReviewerAction(ReviewerAction) |
| 子任务1：review: InputWriter | get\_memories\_InputWriter [user: None]  File already exists in . Skipping... |
| 子任务2：review: Runner | No error logs found.  controlDict file not found. |
| 进行当前轮次算例生成和计算，总结文件和行数，然后循环。 | Subdirectory File Count Line Count  '0.orig' 5 204  'system' 5 260  'constant' 2 34  Total 12 498 alphaOpenfoam\_v2 main循环 |
| runtimes: 2… | |

Mermaid代码：

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A[配置环境与嵌入] -->|运行run\_pipeline.sh| B[主程序 src/alphaOpenfoam\_v2.py]

B --> |读取输入文件.yaml| C[用户需求: usr\_requirment]

C --> D[启动 base\_env.py]

D --> E[启动 Architect.py]

E --> |设定解决方案框架, 查找相似算例, 细分子任务| F[启动 InputWriter.py]

F --> |生成相应文件| G[启动 Reviewer.py]

G --> |检查并纠错, 重新调用 InputWriter 和 Runner (如有错误)| H[启动 Runner.py]

H --> |生成 Allrun 文件, 启动 OpenFOAM 计算进程| I[alphaOpenfoam\_v2 主循环]

I --> |进行当前轮次算例生成和计算, 进入循环| J[循环结束]

